U.PORTO

2º CICLO DE ESTUDOS
FINANÇAS

Fire sales: reality or perception?

Susana Fernandes da Cunha Freitas

M

2018

U.PORTO

FEP FACULDADE DE ECONOMIA UNIVERSIDADE DO PORTO

FIRE SALES: REALITY OR PERCEPTION?

Susana Fernandes da Cunha Freitas

Dissertation
Master in Finance

Supervised by
Miguel Augusto Gomes Sousa, PhD

2018

Acknowledgements

I take this opportunity to express my deepest gratitude to Professor Miguel Sousa. I thank him for his invaluable guidance, comments, and help since the early beginnings of this dissertation, and for his unbelievable patience when dealing with my never-ending questions and doubts.

Even so, and despite his major role in this dissertation, I am even more grateful to him for having introduced me to Finance in an interesting, meaningful, and challenging manner. He has indubitably influenced my path.

Muito obrigada Professor!!

And, on a different tone, a word of appreciation to my older sister Cristiana for listening to my constant babble about Finance and for being understanding and patient when dealing with my constant…sorry…very rare bad temper.

Abstract

The finance literature has identified several indirect costs of bankruptcy, being one of them asset fire sales. Previous studies on the existence of fire sales of heterogeneous real assets have mainly focused on the seller's stock price reaction at the sale announcement. However, these studies have reported conflicting results. As such, we bring new evidence on its existence by studying the value creation from acquiring assets from distressed firms, focusing on acquisitions of divested assets (assets, subsidiaries, divisions) involving US nonfinancial public firms between 1997 and 2017.

Although, we started by finding that acquiring divested assets from distressed sellers create value (to the acquiring firm), suggesting the existence of fire sales, the results also suggest the value creation only occurs because investors believe fire sales exist, as the primary results are driven by those deals for which the deal value is not known. Our results suggest that the type of asset acquired and the method of payment are important determinants on investors' perception of fire sales, as we only find a statistically significant positive impact on CAR for those acquisitions that investors may interpret as more likely to be a fire sale (i.e., seller's non-core assets when the method of payment does not involve equity). Moreover, the results are consistent with investors assessing differently not disclosing the deal value at the announcement date depending on the financial condition of the seller. Contrarily to non-distressed acquisitions, in distressed acquisitions there is a statistically significant positive impact on CAR when the deal value is not disclosed.

Keywords: Fire Sales; Bankruptcy Costs; Financial Distress; Acquirer CAR; Undisclosed Deal Value.

JEL-Codes: G14; G33; G34

Sumário

De acordo com a literatura, um dos custos indirectos de falência é a venda de activos abaixo do seu valor fundamental – *fire sales*. Estudos anteriores investigando se *fire sales* existem focaram-se principalmente na reacção ao anúncio da venda de activos no preço das ações do vendedor. No entanto, os resultados destes estudos não são concordantes. Dessa forma, estudamos se *fire sales* existem analisando a criação de valor na aquisição de activos de empresas em dificuldades financeiras, e focando-nos em aquisições de activos envolvendo empresas públicas não financeiras Norte Americanas entre 1997 e 2017.

Apesar de inicialmente os resultados indicarem que adquirir activos de empresas em dificuldades financeiras cria valor (para a empresa adquirente), sugerindo que *fire sales* existem, os resultados também sugerem que a criação de valor só ocorre porque os investidores acreditam que *fire sales* existem, uma vez que os resultados iniciais se devem às transações para as quais o seu valor não foi divulgado. Os nossos resultados sugerem que o tipo de activo adquirido e o método de pagamento são importantes na percepção de *fire sales* por parte dos investidores, uma vez que só verificamos um impacto positivo estatisticamente significativo nos retornos anormais acumulados (CAR) para as aquisições em que os investidores podem interpretar como mais prováveis de *fire sales* ocorrerem (i.e. activos *non-core* do vendedor quando o método de pagamento não envolve acções). Para além do mais, os resultados são consistentes com a não divulgação do valor da transacção à data do anúncio ser avaliada de forma diferente pelos investidores de acordo com a condição financeira do vendedor. Contrariamente às aquisições de activos em que o vendedor não está em dificuldades financeiras, em aquisições em que o vendedor está em dificuldades financeiras há um impacto positivo significativo no CAR quando o valor da transacção não é divulgado.

Index

Index of Tables

Index of Figures

1. Introduction

"Chesapeake Energy: Forced into fire sales? Chesapeake Energy must rapidly sell assets to keep itself afloat."

- Maureen Farrell[1], CNN Money, Apr. 20, 2012

"AMC Entertainment's Fire Sale Has Begun: AMC Entertainment (NYSE: AMC) isn't wasting any time shedding assets. (…) To help shore up its finances, which suffer from deep indebtedness in addition to that now significant net loss, AMC promised it would unload around $400 million worth of assets."

- Eric Volkman[2], The Motley Fool, Aug 12, 2017

Since the seminal work of Modigliani and Miller (1958), several capital structure theories have been developed, and firms' capital structure choices and their determinants have been the focus of many researchers. Under the trade-off theory the present value of tax benefits must offset the present value of expected bankruptcy costs at the margin.

The present value of expected bankruptcy costs depends not only on the probability of bankruptcy but also on the magnitude of the bankruptcy costs, which the literature divides into direct and indirect costs. Contrarily to the direct costs (e.g. administrative costs, legal fees), the indirect (e.g. higher cost of credit, loss of bargaining power to suppliers, asset fire sales) are not limited to firms that actually become bankrupt. Firms that have high probabilities of bankruptcy can still incur in these costs even if they do not end-up becoming bankrupt (Altman, 1984). Warner (1977, p. 339) describes indirect costs as *lost opportunities*, and states *"they are inevitably difficult, if not impossible to measure"*.

Consequently, there is really no consensus in the literature about their magnitude and their relevance. Indeed, Elkamhi *et al.* (2012) argue that the lack of consensus on the trade-off theory's empirical evidence is largely driven by the differences in how the present value of the bankruptcy costs have been estimated, and state (p. 76), *"(…) by showing that losses following bankruptcy are not the dominant consideration for ex ante leverage decisions, our results call for a shift in attention toward the types of costs (…) likely to be incurred as the mere possibility of bankruptcy increases"*.

[1] https://money.cnn.com/2012/04/20/markets/chesapeake-energy-fire-sale/index.htm
[2] https://www.fool.com/investing/2017/08/12/it-looks-like-amc-entertainments-fire-sale-has-beg.aspx

The aim of this dissertation is to study one of the indirect costs of bankruptcy: asset fire sales by distressed firms. A fire sale is a sale of an asset below fundamental value due to the seller's financial distress condition (Shleifer and Vishny, 1992).

In the real assets fire sale literature there has been mainly two approaches to study the existence of fire sales by distressed firms: one is to study the transaction price compared to fundamental value (e.g., Pulvino (1998) for aircraft and Chu (2016) for real estate properties); the other, due to the difficulty of measuring fundamental value, is to study the seller's stock price reaction to the asset sale announcement, but this last approach has found conflicting results. Brown *et al.* (1994) find that distressed firms that sell assets to repay debt experience negative returns, whereas Lang *et al.* (1995) find that distressed firms selling assets to repay debt leads them to positive returns. A possible reason for the conflicting results is that the sale announcement conveys more information than the information about the fire sale discount (Lang *et al.*, 1995), since the amount received from the asset sale leads to a decrease of the probability of bankruptcy, an asset sale announcement by a distressed firm should have a positive reaction on the seller's stock price (Lasfer *et al.*, 1996).

Even so, we argue that a firm may sell assets at fire sale discounts and still have a positive stock price reaction at the sale announcement. Asset sales work as a mean to raise capital. Consequently, when a firm starts to be in distress and its financial health worsens it becomes more likely that it will have to sell assets to ease its financial situation. Thus, the stock price will incorporate this likelihood. And even if the firm sells assets at fire sale discounts, but the sale price is above to what the market was expecting, the sale announcement will be good news and a positive reaction should be expected. However, when considering the impact of a fire sale on the stock price of the acquirer a positive reaction should always be expected, given that it is buying assets below their fundamental value, and the higher the discount, the higher the positive return. With all this in mind, we investigate whether asset fire sales exist by studying the acquirer's value creation from acquiring assets from distressed firms.

The value creation from acquisitions has extensively been studied and a common conclusion is that M&A of public targets leads to zero-to-negative announcement returns and acquisitions of private targets (subsidiaries or stand-alone firms) to positive returns (e.g. Fuller *et al.*, 2002; Moeller *et al.*, 2004; Faccio *et al.*, 2006). This return differential has been attributed to the "listing effect", the common practice of applying the "private

discount factor". In fact, Officer (2007) finds that unlisted targets (stand-alone and subsidiaries) were sold at an average discount of 15% to 30% when compared to acquisition multiples of comparable listed targets.

Previous studies (e.g. Masulis and Nahata, 2011; Jindra and Moeller, 2015; Greene, 2017) have shown that a weaker (stronger) bargaining condition affects negatively (positively) the prices obtained by the sellers, which affects positively (negatively) the wealth gains for the acquirers. Similarly, we also study how a weaker bargaining position affects the wealth gains from the acquisition, and this weaker position is being in distress.

We argue that if there is in fact a typical discount to provide liquidity, then for distressed firms the discount will be higher, which will be represented in higher returns for the acquirers, since sellers in a higher need for liquidity are in a weaker bargaining position vis-à-vis non-distressed sellers, and, as suggested by Officer (2007), they will be prepared to accept lower acquisition prices compared to "fair" value of the assets. In fact, he found that on average selling-parents in a higher need for liquidity sold their subsidiaries at 10% greater discount than "healthy" parents.

We focus on acquisitions of divested assets (assets, subsidiaries, divisions) between 1997 and 2017 involving US nonfinancial public firms, including deals with undisclosed deal value and undisclosed method of payment at the deal announcement in order to investigate how the market reacts depending on in this lack of information. We exclude deals in which the selling firm is already in bankruptcy or in liquidation, because we are interested in investigating asset fire sales in order to avoid bankruptcy and not in asset fires sales in which the firm is required to sell assets because it is already bankrupt. Besides, the motivation/bargaining condition of a distressed firm is completely different from a bankrupt firm, as such including bankrupt firms would demand a separate analysis, otherwise these deals could drive the results.

We find that on average acquisitions of assets from distressed sellers create significantly more value, which suggests that fire sales of heterogeneous real assets exist. However, this result is driven by the deals in which the deal value was not disclosed at the announcement. When the deal value is disclosed the returns for acquisitions of assets from distressed and from non-distressed sellers are not statistically different from each other. The investors only assess the deals for which they do not know the deal value as acquisitions at fire sale discounts, which suggests that fire sales only exist because investors believe that they exist.

Our results suggest that the type of asset acquired and the method of payment are important determinants on the market's perception of fire sales. We find a statistically significant positive impact on acquirer returns when acquiring assets from distressed sellers but limited to those acquisitions that the market may interpret as more likely to be a fire sale, i.e. acquisitions of seller's non-core assets when the method of payment does not involve equity.

Additionally, we investigate the effect of the deal value non-disclosure on acquirer returns. The results are consistent with the market assessing differently the non-disclosure of deal value depending on the financial condition of the seller. In line with Sicherman and Pettway (1992), and Martynova and Renneboog (2011), we find a statistically significant negative impact on CAR when the deal value is not disclosed, but only for non-distressed. For distressed it is significantly positive. The results suggest that the lack of information about the deal value makes investors pessimist about the amount paid when the acquisition is from a non-distressed seller, whereas when the acquisition is from a distressed seller it makes them optimist. It makes investors so optimist that the total effect is positive.

The present work makes several contributions not only on Fire Sales but also on M&A literature. First, we investigate asset fire sales by studying the value creation from acquisitions of assets from distressed firms and provide evidence suggesting that from acquirers' perspective fire sales exist. And contrarily to Meier and Servaes's (2015) argument, who also find evidence of asset fire sales from acquirers' perspective but focusing mainly on bankrupt sellers, we show that the loss of control in the decision making by the selling firm management is not a necessary condition for acquirers to take advantage of selling firms in financial distress.

Second, we analyse the effect of not disclosing the deal value in asset acquisitions from distressed sellers, Sicherman and Pettway (1992) focus on a weaker bargaining condition of the seller not on seller's distress, as they argue that a seller does not need to be in distress to be in a weaker bargaining condition and use the seller's credit downgrade as a proxy for it.

Third, we provide evidence on the wealth effects of acquiring assets from distressed sellers, previous studies have focused on acquisitions of divested assets as a whole. In fact, contrarily to previous work (e.g. Moeller *et al.*, 2004; Slovin *et al.*, 2005; Faccio *et al.*, 2006) that finds higher significant returns when acquiring unlisted targets (stand-alone firms,

subsidiaries only, and divested assets) with equity, we provide evidence that when the acquisition is from distressed sellers the returns are insignificant.

And fourth, as Martynova and Renneboog (2011), we also include in our sample deals with undisclosed deal value, and deals with undisclosed method of payment. However, they do not include acquisitions of divested assets in their sample and when they analyse the returns by method of payment they group them together. Our results suggest that for acquisitions of divested assets the deal value non-disclosure plays a more important role on returns than not disclosing the method of payment only, as we find positive significant returns for both distressed and non-distressed acquisitions when only the method of payment is undisclosed, possibly because the market assumes that the acquisition is going to be financed by all-cash.

The remainder of this dissertation is organized as follows. In Chapter 2 we provide an overview of we consider to be the most relevant literature for our topic. In Chapter 3 we develop our main hypothesis and present the methodology that we employ. In Chapter 4 we describe our sample construction and characteristics. Chapter 5 presents our results, and in Chapter 6 we conclude.

2. Literature Review

In this chapter we provide an overview of what we consider to be the most relevant literature for our topic. We start with the Trade-Off Theory then it follows some possible explanations for assets sales proposed by the literature. In the third section the concept of fire sales is presented as well as empirical studies on its existence, and in the fourth we give an overview of studies concerning Mergers and Acquisitions (M&A). Finally, in the fifth and final section, we present what we consider to be the literature gap our study fills.

2.1. Trade-Off Theory

The seminal work of Modigliani and Miller (1958) led to several contributions from different authors[3] to develop the Trade-Off Theory. This theory states that there is an optimal amount of debt in the capital structure for each firm, which will depend on a trade-off between the benefits and the costs of debt financing[4].

According to the theory, the primary benefit from debt is that interest payments are tax deductible. As such, a higher usage of debt increases the amount of interest payments, which decreases the amount of taxes paid. However, as the debt ratio increases it also increases the probability of bankruptcy (Scott, 1976). Therefore, a firm will increase the amount of debt in its capital structure, only if the present value of the marginal tax benefits offsets the present value of the marginal expected bankruptcy costs (Myers, 2001).

The present value of expected bankruptcy costs depends not only on the magnitude of the direct and indirect costs of bankruptcy, but also on the probability of bankruptcy. The direct costs of bankruptcy include legal, accounting, filling and other administrative costs, all the expenses that a firm incurs when going through the process of bankruptcy; whereas the indirect costs are not limited to firms that actually become bankrupt. Firms that have high probabilities of bankruptcy can still incur in these costs even if they do not end-up becoming bankrupt (Altman, 1984). The indirect costs include lost sales, lost profits, higher cost of credit, loss of bargaining power to suppliers, lost of investment opportunities, asset fire sales.

---

[3] See, for example, Kraus and Litzenberger (1973), Jensen and Meckling (1976), Scott (1976), Kim (1978).

[4] In the costs and benefits of debt are also included the reduction of agency costs between managers and shareholders (Jensen, 1986), but also the increase of agency costs between shareholders and bondholders (Harris and Raviv, 1991). Therefore, an optimal capital structure includes trading-off these agency benefits and costs of debt (Jensen and Meckling, 1976).

The theory predicts a cross-sectional relationship between debt ratios and asset risk, taxes, profitability, and asset type. And in regard to the latter, authors have argued that there is a link between the optimal amount of debt in the capital structure and their liquidation values.

2.2. Asset Sales

An asset sale[5] is the transfer of control of a subsidiary, division, or other combination of assets to another entity for cash, securities, and/or other future consideration (Hite *et al.*, 1987). An asset sale is not only an important way for a firm to resolve financial distress (Shleifer and Vishny, 1992), but it can also work as a mean to restructure the firm's business portfolio (Lasfer *et al.*, 1996).

The empirical evidence on asset sales suggests that they are typically a value enhancer operation, leading to positive abnormal returns at the sale announcement[6]. The literature also provides several possible explanations for the motivation to sell assets as well as for the value gains at the sale announcement.

According to the *efficiency hypothesis*, a firm sells assets to those that can manage them more efficiently. The buyer values the asset highly due to its ability to generate cash flows from it, which can come from competitive advantages or operational synergies. Therefore, it is willing to pay a high premium for the asset, which will be reflected in the seller's abnormal return at the sale announcement[7] (Hite *et al.*, 1987).

The *focusing hypothesis*, as proposed by John and Ofek (1995), suggests that firms engage in asset sales to increase the focus on their operations. By selling unrelated assets to its core business, the firm is able to eliminate negative synergies and to be more focused on its core business. These will lead to a better performance of the remaining assets. The present value of the future cash flows generated by the remaining assets will increase, which will be represented in value gains at the announcement.

An alternative view, the *financing hypothesis*, argued by Lang *et al.* (1995), is that asset sales provide funds when other sources of finance are too expensive, becoming the cheapest way to finance new investments. However, for firms with high agency problems

[5] An asset sale can also be described as a sell-off or a divestiture.
[6] See, for example, Rosenfeld (1984), Klein (1986), Hite *et al.* (1987), Sicherman and Pettway (1992), John and Ofek (1995), Lang. *et al.* (1995).
[7] The sale can be seen as a positive net present value project, because the present value of the cash flows that the seller can generate with the asset will be lower than the price received.

between shareholders and managers, if the proceeds are going to be retained by the firm a negative reaction should be expected (Lang *et al.*, 1995); while for firms paying-out the proceeds, or in financial distress and/or highly leveraged a positive reaction should be expected (Lang *et al.,* 1995; Lasfer *et al.*, 1996).

The *liquidity hypothesis* is connected to the three previous ones. Schlingemann *et al.* (2002) argue that, conditional on having fundamental reasons to sell assets and having the choice of which ones to sell, a firm will sell the assets that are relatively more liquid, meaning that they can be sold faster without a discount. However, the eagerness to sell typically reduces the amount received due to a weaker bargaining position (Aktas *et al.*, 2010), and for distressed firms their necessity to sell may lead to fire sales.

2.3. Fire Sales

The concept of fire sales has long evolved since its beginnings, in the nineteen century, when it was used to describe goods sold at deep discounts due to fire damage.

Nowadays, in finance, a fire sale is a sale of an asset at a dislocated price (Shleifer and Vishny, 1992), meaning that the price received does not reflect its long run potential, its fundamental value[8]. The sale is forced, in the sense that the seller is experiencing constrains that diminishes his bargaining power, typically financial constrains. Therefore, the firm has to sell assets to raise funds[9], leading it to have to accept prices that otherwise it would not.

There is a wide variety of empirical studies on the existence of fire sales. Adaptations[10] of the concept of fire sales have been done for different types of assets and of constrains that affect the bargaining power of the seller. Even though the concept of fire sales is well established, the approaches to what defines the existence of fire sales, among studies, vary.

One of the approaches found in the literature is to study the transaction price compared to an estimated fundamental value[11].

Pulvino (1998) studies the sale of used aircraft by financial distressed US firms, between 1978 and 1991, and finds that distressed airlines sold used aircraft at an average

[8] In Shleifer and Vishny (1992), they begin by using the expression "value in best use", but along the paper the expressions "value in best use" and "fundamental value" are used interchangeably.
[9] The *financing hypothesis* for asset sales mentioned in the previous section.
[10] Krugman (2000) developed a model of Fire Sales for FDI. He suggests that when a country is affected by a crisis, the countries' corporate assets are sold to foreign investors at discounted prices. For studies on this issue see, for example, Chari *et al.* (2010), Weitzel *et al.* (2014), Alquist *et al.* (2016).
[11] The fundamental value is estimated through hedonic regressions, or it is set as a benchmark or fair value of comparable assets.

discount of 10% to 20% compared to healthy airlines. Moreover, when the industry is distressed and the prices are depressed, the distressed firms are net-sellers of used aircraft and the non-distressed firms net-buyers. While when the industry is booming and the prices are high they find the opposite, the distressed firms become net-buyers and the non-distressed net-sellers. As such the discount is costly for distressed firms but it represents a buying opportunity for non-distressed firms.

Ang and Mauck (2011), using the stock price one month prior to the announcement, investigate fire sale discounts in M&A of US distressed public targets during economic crisis, between 1977 and 2008. However, instead of a discount, they find that distressed targets received a significant higher average premium than non-distressed targets, both in normal as in crisis periods (12.46 p.p. and 34.65 p.p., respectively). Conversely, when they use the 52-week high instead, they do find significant discounts, which they attribute to acquirers' managers viewing the price paid as a significant fire sale discount. Additionally, they analyse the three-year Buy-and-Hold Abnormal Returns (BHAR) of the acquiring firms and do not find evidence supporting the existence of fire sales.

Chu (2016) examines the sale of Real Estate Owned (REO) properties by US commercial banks during the financial crises (2008-2010). His results show that banks with lower liquidity level received lower sale prices for REO properties and these properties experienced higher price reversals in the following sales.

Another approach found in the literature is to identify fundamental value ex post by studying the patterns of transaction prices over time, and fire sales are said to exist if the price shows reversals.

Coval and Stafford (2007) show that financially distressed US mutual funds sold equities at an average 7.9% discount. A similar finding was obtained by Edmans *et al.* (2012) in a study of price effects on takeover activity. They also show that distressed mutual funds sold equities at fire sale discounts and the price reversal, as Coval and Stafford (2007), took 24 months.

Ellul *et al.* (2011) investigate the fire sale of downgraded corporate bonds by regulated-constrained US insurance companies. They find that constrained insurance companies are more likely to sell downgraded bonds at prices farther from fundamental value, with a significantly lower median discount of 6%. Besides the evidence on fire sale discounts, a similarity between this study and the one by Pulvino (1998) is that the discount deepens when the assets' acquirer is a non-natural buyer, which is consistent with Shleifer

and Vishny (1992). In their theoretical model, Shleifer and Vishny (1992) show that the fire sale discount is higher when the buyer is an industry outsider. The argument behind it is that because industry outsiders are not specialized in the asset use, they will not value the asset as highly as industry insiders and, thus, will offer even lower prices.

More recently, Dinc *et al.* (2017) study the sale of minority equity stakes in publicly listed firms by industry distressed firms in the US, between 2000 and 2012. Their results show an average industry-adjusted discount of 8%[12]. They also find that when the stake sold is higher than 5%, the average industry-adjusted discount increases to about 14%, but they do not find any discount when this type of sale is done in non-distressed deals.

A different approach is found in Brown (2000). He compares the effect of the decline in commercial real estate values on mortgage and equity real estate investment trusts (REITs) and shows that financially distressed mortgage REITs experience significant negative stock returns when they sell foreclosed real estate, during 1989 and 1992. He also finds that, during this period, mortgage REITs are net sellers and equity REITs are net buyers and suggests that the decline in real estate values forced a systematic sale of real estate at fire sale discounts that represented a buying opportunity for less leveraged firms.

Another approach found in the literature is to study the seller's stock price behavior at the asset sale announcement.

Dennis and Dennis (1995) study asset sale announcements by US firms that became distressed after leverage recapitalizations[13]. They find that the average cumulative abnormal return (CAR) for non-distressed firms is significantly positive while for distressed firms is insignificantly negative.

Brown *et al.* (1994) examine asset sales by distressed firms between 1979 and 1988 in the US, and report that the average abnormal return for distressed firms that sell assets to repay debt is negative, but insignificant. However, a conflicting result is found by Lang *et al.* (1995). In their study of asset sales by US firms between 1984 and 1989, they find that distressed firms selling assets to repay debt experience significant positive returns. They suggest that a possible reason for the conflicting results is that the sale announcement conveys more information than the information about the fire sale discount.

In line with this previous reasoning, Lasfer *et al.* (1996) argue that since the amount received from the asset sale leads to a decrease of the probability of bankruptcy, an asset

[12] A similar average discount is found when they use the seller's distress condition instead of industry distress.
[13] The authors define leverage recapitalizations as operations in which debt is raised to pay-out to shareholders.

sale announcement by a distressed firm should lead to a positive reaction on the seller's stock price. Indeed, in their study of asset sales by UK firms, between 1985 and 1986, they show that distressed firms experience significantly higher positive abnormal returns than non-distressed.

More recently, Finlay *et al.* (2016), in a study of asset sales by UK firms between 1988 and 2009, and due to the conflicting results found in the literature, propose that the stock price reaction at the sale announcement will depend on the type of distress condition: firm-level, industry-wide[14] and economy-wide distress, and also on the interaction between these distress conditions. Their results for firm-level distress are similar to Lasfer *et al.* (1996), with a higher positive abnormal return for distressed firms than for non-distressed, however they are not statistically different. The interaction between firm distress and industry distress, leads to insignificant returns, and the interaction among the three measures of distress leads to significant positive abnormal returns.

Finally, the last approach found in the literature is to study the acquirer's stock price behavior at the acquisition announcement.

Meier and Servaes (2015) study the value creation from acquisitions of bankrupt and distressed firms as well as acquisitions of divested assets from bankrupt and distressed sellers in the US, between 1982 and 2012. They define as fire sale acquisitions those in which the seller/firm is in liquidation, in bankruptcy, or in distress and find, for their three-day event window, significant positive mean abnormal returns for all type of acquisitions, however, fire sale acquisitions yield significantly higher returns than regular transactions (i.e., non-bankrupt, non-liquidating, and non-distressed). The mean abnormal returns for fire sale acquisitions of assets is 3.04% while for regular asset acquisitions is 1.51% and for fire sale acquisitions of firms is 4.76% while for regular firm acquisitions is 0.81%. Their result for fire sale acquisitions of firms is similar to the one document by Hotchkiss and Mooradian (1998) in their study of acquisitions as a means of restructuring bankrupt firms (Chapter 11) between 1972 and 1992, in the US. Hotchkiss and Mooradian (1998) report that, for their event window [-1;+5], acquirers of bankrupt firms experience significant positive abnormal returns of 4.0%.

More recently, Oh (2018) studies the wealth effect from acquiring distressed but non-bankrupt US public firms between 1980 and 2010. He defines as fire sale acquisitions

[14] According to Shleifer and Vishny (1992), an industry-wide shock would make industry insiders to be less likely to bid for the assets, and, thus, only industry outsiders would bid for the assets, leading to lower acquisition prices.

those in which both target and its industry are in distress, and, in the multivariate analysis, he finds that acquirers in fire sale acquisitions experience statistically higher three-day CARs and also two-year BHARs than acquirers in other transactions. Moreover, he finds that fire sale targets received statistically lower transaction prices than other targets.

2.4. Mergers and Acquisitions

While the Fire Sale literature studies the value loss for selling firms, the M&A literature has extensively studied the value gains for acquiring firms. In the first sub-section we start by presenting some of these studies and also studies on how the bargaining condition of the target/seller affects the value creation from the acquisition; and in the following one we present some of the determinants of acquirer returns.

2.4.1. Value Creation from Acquisitions

As formerly mentioned, the value creation from acquisitions has extensively been studied and a common conclusion is that M&A of public targets leads to zero-to-negative announcement returns and the acquisition of private targets (subsidiaries or stand-alone firms) to positive returns[15](e.g. Fuller *et al.*, 2002; Moeller *et al.*, 2004; Faccio *et al.*, 2006).

This return differential has been attributed to the "listing effect", the common practice of applying a "private discount factor". Fuller *et al.* (2002) argue that because private targets are less liquid, the acquirer is in a stronger bargaining position and, thus, it captures the discount. In fact, Officer (2007) reports that unlisted targets (stand-alone and subsidiaries) were sold at an average discount of 15% to 30% when compared to acquisition multiples of comparable listed targets, and also that parent-firms constrained by a higher need for liquidity sold their subsidiaries at an average 10% greater discount. He suggests that acquisition discounts for unlisted targets are the price paid by their owners to access an important source of liquidity.

Consistent with this "private discount factor" both Fuller *et al.* (2002) and Moeller *et al.* (2004) find a significant positive CAR for US acquirers of subsidiaries[16] (2.75% and 2%, respectively). Faccio *et al.* (2006) also find a significant positive average CAR (1.44%) for acquisitions of subsidiaries by Western European firms.

[15] See annex 1 for a summary of the results of recent studies showing this return differential.
[16] Moeller *et al.* (2004) use the term subsidiary acquisition to denote acquisitions of subsidiaries, divisions, and branches.

The results from these more recent studies for the US are in line with the one reported by Rosenfeld (1984), in his study of the effects of voluntary divestitures on shareholder's wealth, between 1969 and 1981 in the US. He finds, for a three-day event window around the announcement, a positive significant return for acquirers of divested assets of 2.1%.

Similarly, Sicherman and Pettway (1992) analise the effects of voluntary divestitures on shareholder's wealth in the US, but between 1981 and 1987, and find a significant positive CAR for their two-day event window, however smaller (0.50%). Additionally, they study if the credit downgrade of the seller before the sale announcement affects its bargaining position. They argue that a firm does not need to be in distress to lose bargaining power since the downgrade can inform the buyers that the firm's financial condition has negatively changed. The CAR for acquisitions of assets from downgraded sellers increases and for non-downgraded decreases, however they are both marginally significant.

The literature also provides other studies investigating if the bargaining position of the target and/or seller influences the value creation from the acquisition.

Masulis and Nahata (2011) analise the effects of venture capital (VC) backing on the value creation of private firm acquisitions. One of their findings is that firms backed by funds closer to liquidation, therefore more likely to exert greater pressure on their portfolio firms to sell and avoid long negotiations, received a significantly lower median takeover premium than by those backed by VC funds farther from liquidation (3.25% and 6.38%, respectively). They also find, for their five-day event window, a higher median CAR for acquisitions of firms backed by VC funds closer to liquidation (5.04% vs. 3.81%), however the difference is not statistically significant.

Jindra and Moeller (2015) argue that targets with greater financial independence have a stronger bargaining position. In their study on how the financial independence of US public targets affects the takeover premia and the value creation from acquisitions between 1982 and 2008, they show that acquisitions of more financially independent targets are associated with higher takeover premia and lower acquirer announcement returns.

More recently, Greene (2017) investigates if the deregulation of the US banking industry affected the bargaining power of private targets on M&A by public firms between 1992 and 2000. The results suggest that deregulation improved private firms' bargaining position, which led to an increase in the targets valuation multiples and, therefore, a

decrease in acquirer announcement returns. For the eleven-day event window, the average CAR for acquirers of targets operating in a non-deregulated banking environment is 4.23%, and 2.93% when the target operates in a deregulated environment.

2.4.2. Determinants of Acquirer Returns

Several factors have been reported to influence acquirer returns, including the acquirer's size, the relative size of the deal, the method of payment, the industry relatedness of the acquisition, deal value (non-)disclosure, among others.

Acquirer's Size. Studies have shown that acquirer returns are inversely related to its size, finding that announcement returns for acquiring firms are higher for small firms and lower for large ones (e.g. Loderer and Martin, 1990; Moeller *et al.*, 2004; Faccio *et al.*, 2006; Jindra and Moeller, 2015). Roll (1986) hypothesises that managers may suffer from hubris that makes them overpay in acquisitions, and Demsetz and Lehn (1985) find that managers tend to have more firm ownership in small firms than in large ones. Managers of larger firms may be more prone to hubris because they feel more important socially, since they have succeeded in growing the firm, and also face fewer obstacles to finance the deal, while in small firms the managers and shareholders' incentives are more aligned (Moeller *et al.*, 2004). As suggested by Moeller et *al.* (2004) the acquirer's size may proxy for the severity of agency costs.

Relative Size of the Deal. The relative size of the deal, which is typically defined as the ratio between the deal value and the market value of the acquirer, also influences acquirer returns. However, the literature has produced mixed results in regard to its impact. For example, Asquith *et al.* (1983), and Jarrel and Poulsen (1989) find a positive relationship between relative size and acquirer returns, while Travlos (1987) and Alexandridis *et al.* (2013) find a negative one. Fuller *et al.* (2002) and Moeller *et al.* (2004) also find a negative effect on CAR as the relative size increases when their analysis is limited to acquisitions of public targets or when it is limited to large acquirers, respectively. Loderer and Martin (1990) argue that acquirers experience greater losses when buying large targets because they are more likely to overpay. Also, larger targets are associated with greater complexity in terms of their integration and management that makes it more difficult for acquirers to achieve the expected economic benefits from the deal (Alexandridis *et al.*, 2013). Nevertheless, for acquisitions of unlisted targets, several studies have found a positive and

statistically significant effect of relative size on acquirer returns (e.g. Fuller *et al.*, 2002; Slovin *et al.*, 2005; Faccio *et al.* 2006; Mantecon, 2008; Masulis and Nahata, 2011).

Method of Payment. According to the literature, the method of payment is one of the most significant determinants of acquirer returns. While it has been observed that acquisitions of public targets with equity leads to lower returns (e.g. Travlos, 1987; Fuller *et al.*, 2002), for acquisitions of unlisted targets (stand-alone firms, subsidiaries, and divested assets) the opposite has been found, with payments with equity leading to higher returns than with all-cash (e.g. Chang, 1998; Moeller *et al.*, 2004; Slovin *et al.*, 2005; Faccio *et al.*, 2006). The lower returns for acquisitions of public targets with equity are consistent with Myers and Majluf (1984), because it signals negative information about the shares' value (Travlos, 1987), however, for acquisitions of private targets the opposite has been argued. According to Chang (1998) and Slovin *et al.* (2005), the willingness of the target/seller to accept equity signals positive private information about the value of the acquirer and the assets acquired, because the target/seller becomes exposed to the risks of the acquirer's value and future performance. Therefore, they will be incentivised to assess the acquiring firm's prospects carefully (Chang, 1998) so that accepting equity can generate more favorable returns than all-cash (Slovin *et al.,* 2005).

Industry Relatedness. The industry relatedness between the acquirer and the target also affects acquirer returns. Recent studies have reported higher gains when the acquirer and target are in related industries (e.g. Sicherman and Pettway, 1987; Morck *et al.*, 1990; Maquieira *et al.*, 1998; Moeller *et al.*, 2004), and also that firm value decreases with the degree of diversification (e.g. Berger and Ofek, 1995; Comment and Jarrell, 1995). Synergy gains tend to be higher for focus-increasing than diversification deals, and therefore the likelihood of overpayment is lower (Chang, 1998). Also, corporate combinations are more likely to succeed if between related firms, because there is a greater knowledge about the business and thus can be managed more efficiently (Sicherman and Pettway, 1987). Though corporate diversification may bring benefits such as greater debt capacity and lower taxes, it may also bring costs, such as overinvestment and subsidization of poor performing businesses (Berger and Ofek, 1995).

Deal Value (Non-)Disclosure. The deal value (non-)disclosure at the announcement also affects acquirer returns. Sicherman and Pettway (1992) find that acquirers of divested assets experience positive and significant returns when the deal value is disclosed, and positive insignificant returns when not disclosed, the difference is significant at 10% level. When

they divide the undisclosed deal value sample according to whether the seller has been downgraded or not, the acquirers' returns remain insignificantly positive. Martynova and Renneboog (2011) also find, for their entire short window, that bidders in takeovers in Continental Europe and UK during the fifth takeover wave experienced positive, but insignificant returns when the deal value (and/or the method of payment) was undisclosed, and that this lack of disclosure concerning the deal characteristics has a significant negative effect on bidding firms returns. These results are consistent with Milgrom's (1981) model in which, given incomplete information, not disclosing all information leads the uninformed to rationally expect this information to be unfavorable.

2.5. Literature Gap

Several studies provide empirical evidence on the existence of fire sales and show how they lead to losses for distressed sellers and gains for the acquirers. However, for more heterogeneous real assets the empirical studies have produced conflicting results. Consequently, the question on the existence of fire sales for this type of assets still remains to be answered, leading to our research question: Do asset fire sales exist?

Our study differs from previous ones on aspects such as sample size and time period, it includes periods that have not been studied yet. But most importantly, we study fire sales from a different approach to what is the standard in the real assets fire sale literature. We contribute to the fire sale literature by providing additional evidence and by investigating the existence of fire sales by studying the value creation from acquiring divested assets from distressed firms only instead of measuring the wealth effects on the seller's stock price at the sale announcement. Also, we include in our sample deals with undisclosed deal value and/or undisclosed method of payment.

Considering the value creation from acquisitions, as mentioned previously, it has extensively been studied and the empirical evidence shows that the bargaining power of the target/seller affects the acquirers' returns. However, these studies have mainly focused on returns differentials among public and unlisted targets, or on factors that affects the bargaining condition of the firms involved in the deal other than distress only. Also, they typically focus on acquisition of subsidiaries only or divested assets (subsidiaries, assets, divisions) as a whole. As such, we contribute to the M&A literature by studying the wealth effects from acquiring divested assets from distressed firms.

We consider the studies of Meier and Servaes (2015), and Sicherman and Pettway (1992) as the most similar to ours. Meier and Servaes (2015) also investigate asset fire sales from the acquirer's perspective. However, they mainly focus on asset sales by firms already in bankruptcy or liquidation, given that, at best, only 25% (92 deals) of their sample of distressed and bankrupt/liquidating deals are distressed deals, and that when analysing the returns they do not make any distinction between them. As such, their results do not apply to distressed sellers because the bargaining position of a firm that is in distressed and sells assets to ease its financial situation in order to avoid bankruptcy is completely different from a firm whose management is no longer fully in control of the decision making and is required to sell assets because it is already in bankruptcy or in liquidation. Sicherman and Pettway (1992) study the wealth effects of acquiring divested assets from sellers in a weaker bargaining condition and also include in their sample deals with undisclosed deal value. However, while they study if the credit downgrade of the seller affects the acquirer's returns, ours involve distressed sellers.

3. Hypothesis Development and Methodology

In this chapter, and based on the previous one, we develop our main hypothesis and also present the methodology that we employ in our study in order to answer to our research question.

3.1. Hypothesis Development

The fire sale literature provides several different methodologies to study fire sales and this variation is a consequence of the necessity to estimate fundamental value. However, the conclusions about its existence depend severely on how fundamental value is measured.

For example, for certain assets it is not possible to estimate fundamental values through hedonic regressions (e.g. Pulvino, 1998; Chu, 2016), nor to observe fundamental value ex post through price reversals (e.g. Coval and Stafford, 2007; Edmans *et al.*, 2012). Consequently, for more heterogeneous real asset, the standard methodology is to analyse the short-term impact on the seller's stock at the sale announcement through event studies (e.g. Brown *et al.*, 1994; Lang *et al.*, 1995).

The short-term event study methodology relies on the assumption that the stock market operates efficiently, thus, any new relevant information will be incorporated fully and instantaneously into the stock prices. At the time of the announcement of an asset sale all the future benefits and costs associated with the deal will be assessed by the market, and as such the stock price will behave accordingly. For announcements the market assesses as value-enhancing there will be an abnormal increase in the stock price; and for value-destroying there will be an abnormal decrease.

However, as formerly mentioned, previous studies investigating fire sales through the analysis of the seller's stock price behavior at the sale announcement have reported conflicting results. Lang *et al.* (1995) suggest that a possible reason for these conflicting results is that the sale announcement conveys more information than the information about the fire sale discount. Since the amount received from the asset sale leads to a decrease of the probability of bankruptcy, an asset sale announcement by a distressed firm should lead to a positive reaction (Lasfer *et al.*, 1996). Therefore, the costs from the fire sale discount would have to be deep enough to offset the benefits from the decrease of the probability of bankruptcy.

Even so, we argue that a firm may sell assets at fire sale discounts and still have a positive stock price reaction at the sale announcement. Asset sales work as a mean to raise capital. Consequently, when a firm starts to be in distress and its financial health worsens it becomes more likely that it will have to sell assets to ease its financial situation. Therefore, the stock price will incorporate this likelihood. And even if the firm sells assets at fire sale discounts, but the sale price is above to what the market was expecting, the sale announcement will be good news and a positive reaction should be expected. However, when considering the impact of a fire sale on the stock price of the acquirer a positive reaction should always be expected, given that it is buying assets below their fundamental value, and the higher the discount, the higher the positive return.

Fuller *et al.* (2002) and Faccio *et al.* (2006) have attributed to the "listing effect" the wealth gains from acquisitions of private targets, meaning that the typical "private discount factor" leads to gains for the acquirer. This can be interpreted as acquisitions of assets below their fundamental value lead, in fact, to higher returns for the acquirers. Therefore, to investigate fire sales we employ the standard methodology used in the M&A literature to study the value creation arising from acquisition announcements on the short-term.

Previous studies[17] have shown that a weaker (stronger) bargaining condition affects negatively (positively) the prices obtained by the sellers, which affects positively (negatively) the wealth gains for the acquirers.

We argue that if there is in fact a typical discount to provide liquidity in the sale of private targets, then for distressed firms the discount will be higher, which will be represented in higher returns for the acquirers than for acquirers of assets from non-distressed sellers. Since sellers in a higher need for liquidity, such as firms in distress, are in a weaker bargaining position vis-à-vis non-distressed, and, as suggested by Officer (2007), they will be prepared to accept lower acquisition prices compared to "fair" value of the assets. In fact, he found that on average selling-parents in a higher need for liquidity sold their subsidiaries at 10% greater discount than "healthy" parents. Our hypothesis is then:

H1: Acquisitions of divested assets from distressed sellers lead to higher (positive) abnormal returns for the acquiring firms than acquisitions of assets from non-distressed sellers.

[17] See annex 2 for a summary.

3.2. Methodology

As already mentioned in the previous sub-section, to investigate fire sales we employ the standard methodology used in the M&A literature, the event study approach, to study the value creation arising from acquisition announcements on the short-term (e.g. Fuller *et al.*, 2002; Faccio *et al.*, 2006). And in a second stage we study the impact of distress on acquirer returns. As such, this sub-section is divided into two different ones. In the first we focus on the event study methodology and in the second one we present our main model for the multivariate analysis.

3.2.1. Event studies

The event study methodology relies on the assumption that the stock market operates efficiently and any new relevant information about the event – the deal announcement – will be incorporated fully and instantaneously into the stock prices, as such the event impact is captured by the abnormal returns (MacKinlay, 1997).

The abnormal return is the actual ex post return of the stock of the firm over the period surrounding the event under study – the event window – minus the normal return of the firm for that same period. The normal return is defined as the expected return for that stock without the event taking place. Thus, for the acquiring firm in deal i and event date t the abnormal return is written by equation (3.1), where AR_{it}, R_{it} and $E(R_{it})$ are the abnormal, actual, and normal return (or expected return) for time period t, respectively.

$$AR_{it} = R_{it} - E(R_{it}) \tag{3.1}$$

According to the Market Model, the expected return of any given stock is related to the return of the market portfolio and is given by equation (3.2).

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} \tag{3.2}$$

Where $E(R_{it})$ and R_{mt} are the period-t returns on security i and the market portfolio respectively; and α_i, and β_i are parameters of the Market Model. α_i is the average return of acquiring firm in deal i that is independent from the market return during period t, and β_i measures the sensitiveness of the acquiring firm stock returns with respect to the market returns.

Since our sample involves only U.S. acquirers listed on American exchanges we use S&P 500 Index as a proxy for the market portfolio. In regard to the models employed, we use two different models of expected returns, we also calculate the simple Cumulative Returns. The firms in our sample are involved in different deals in short periods of time, preventing us from estimating the Market Model parameters, as such in our models of expected returns $\alpha_i = 0$. The expected return in our models is then written as equation (3.3).

$$E(R_{it}) = \beta_i R_{mt} \tag{3.3}$$

Concerning the β_i parameter, given that we are unable to use the regression betas of each firm, in our Market Model we use as proxy for the β_i of each firm Damodaran's industry betas[18]. The other expected returns model employed is the Market-Adjusted Model, in this model $\beta_i = 1$.

Brown and Warner (1985) show that for short-window event studies, weighting the market return by the firm's stock beta does not significantly improve the power of the test. As such, as Fuller *et al.* (2002), as Faccio *et al.* (2006), or as Masulis and Nahata (2011), among others, the main analysis of the returns is done using the Market-Adjusted Model.

In our expected returns models, the daily abnormal returns, which are calculated by using the logarithm transformation, are given by equation (3.4).

$$AR_{it} = R_{it} - E(R_{it}) = R_{it} - \beta_i R_{mt} \tag{3.4}$$

The daily abnormal returns are then cumulated for each event window chosen, and the cumulative abnormal return (CAR) for the acquiring firm in deal i and event window $[t_1; t_2]$ is given by equation (3.5).

$$CAR_{i(t_1,t_2)} = \sum_{t=t_1}^{t_2} AR_{it} \tag{3.5}$$

[18] http://pages.stern.nyu.edu/~adamodar/, accessed on February 15th, 2018.

3.2.2. Multivariate Analysis

To determine the effect of seller's distress condition, we perform a multivariate analysis of acquirer returns. We also include variables that prior studies found to influence acquirer returns. Our main model is defined by equation (3.6)

$$CAR_i = \beta_0 + \beta_1 Distress_i + \beta_2 Equity_i + \beta_3 CoreAssets_i + \beta_4 RelatedIndustry_i + \beta_5 RelativeSize_i + \beta_6 Size_i + \beta_7 CrossBorder_i + \beta_7 SmallSeller_i + \beta_8 C\&ISpread_i + \varepsilon_i \quad (3.6)$$

The variables' definition as well as their expected relationship with CAR, the dependent variable, are as follows[19].

CAR_i is the cumulative abnormal return of the acquirer surrounding the announcement of deal i.

$Distress_i$ is a zero-one dummy variable, one represents an acquisition of assets from a distressed seller, zero otherwise. We follow John *et al.* (1992), Lang *et al.* (1995), Bhagat *et al.* (2005), Ang and Mauck (2011), and Finlay *et al.* (2016), and define firms in distress as those with negative earnings on the previous fiscal year to the sale announcement[20]. Previous studies analysing acquirer returns show a positive coefficient for variables representing a weakened bargaining position of the seller (e.g. Sicherman and Pettway, 1992; Masulis and Nahata, 2011; Greene, 2017), which is the case of a firm in distress. As such we expect a positive effect.

When the method of payment is available on Zephyr database we group it into two different categories: all-cash and equity. We follow Fuller *et al.*'s (2002) approach to define methods of payment that are all-cash and those that involve equity[21]. All-cash includes full payments of any combination of cash, debt, and liabilities; and equity includes payments with any element of equity. $Equity_i$ is then a zero-one dummy variable equal to one if the method of payment involves any form of equity, and zero otherwise. Contrary to what is usually observed in acquisitions of public firms, previous studies have shown that in

[19] See annex 3 for a summary of the variables definition.

[20] We obtain similar results when using other definitions of firms in distress. Among them: 1) including additionally selling firms with two years of negative earnings in the previous three to the sale announcement; 2) requiring additionally for the selling firm to have lower cash flows than short-term debt (Whitaker, 1999); 3) having negative earnings in the previous two years to the sale announcement (Bhagat *et al.*, 2005; Ang and Mauck, 2011); and 4) having low coverage ratios in the previous year to the sale announcement (e.g. Lang *et al.*, 1995; Pulvino, 1998; Bhagat *et al.*, 2005).

[21] Fuller *et al.* (2002) group the methods of payment into three different categories: all-cash; all-stock; and mixed. Mixed is defined as any combination of cash and stock, and in which is included methods of payment classified by the database as "other", we follow the same approach.

acquisitions of unlisted subsidiaries and divested assets when the method of payment involves equity acquirers experience higher returns that those that pay with all-cash (e.g. Moeller *et al.*, 2004; Slovin *et al.*, 2005; Faccio *et al.*, 2006). Thus, we expect a positive sign.

$CoreAssets_i$ is a zero-one dummy variable equal to one if the deal involves the acquisition of seller's core-assets, and zero otherwise. We follow Fuller *et al.* (2002) and define the assets sold as core assets if they share the same 3-digit Standard Industrial Classification (SIC) code with the seller[22], and as non-core assets otherwise. Fuller *et al.* (2002) find higher returns for acquisitions of non-core assets, therefore we expect a negative sign.

$RelatedIndustry_i$ is a zero-one dummy variable equal to one if the assets acquired are from a related industry, zero otherwise. As Faccio *et al.* (2006), we define an acquisition as related if the acquirer shares the same 3-digit SIC code with the assets acquired and as unrelated acquisition otherwise[23]. Sicherman and Pettway (1987) show that the acquisition of divested assets from related industries leads to higher returns, so we expect a positive sign.

$RelativeSize_i$ is the ratio between deal value and the acquirer's size. When the deal value[24] is not disclosed at the announcement, we make the assumption that investors are able to infer the relative deal size given that when the deal is announced it is provided information of which assets are going to be acquired. As such, for the deals that we are able to find the amount paid, even if only disclosed after the announcement date, we use it as a proxy. It has been shown that acquirers of unlisted targets experience higher returns as the relative deal size increases (e.g. Fuller *et al.*, 2002; Slovin *et al.*, 2005; Masulis and Nahata, 2011), thus, a positive effect is expected.

$Size_i$ is the logarithm of the acquirer's size. As Masulis and Nahata (2011), we define the acquirer's size as the market value of equity one month before the deal announcement date. Moeller *et al.* (2004) provide evidence that the acquirer's CAR is inversely related to its size, as such we expect a negative relationship.

We also control for other factors that may influence acquirer returns. As Fuller *et al.* (2002) and Faccio *et al.* (2006) we account for the possibility that cross-border acquisitions

[22] Fuller *et al.* (2002) use the terms "diversified seller" when the subsidiary sold does not share the 3-digit SIC code with the selling firm, and "nondiversified seller" otherwise.
[23] Faccio *et al.* (2006) use the term "within acquisition" when the acquisition is in a related industry.
[24] We take the deal value from Zephyr database. Zephyr describes deal value as "consideration paid for the actual stake acquired".

may have a different effect than domestic ones. We define as cross-border acquisition when the assets acquired do not have the US country code on Zephyr database. Thus, $CrossBorder_i$ is a zero-one dummy variable, one if the acquisition is cross-border, zero otherwise.

Larger firms have better access to Capital Markets (Gilchrist and Himmelberg, 1995), which may provide them a stronger bargaining position in the negotiation process vis-à-vis smaller firms, however, asset sales by larger firms may be subject to greater discounts if bidding firms are unable to absorb larger asset sales (Finlay *et al.*, 2016), thus, we control for the seller's size. As Finlay *et al.* (2016), we define large firms as those larger than the full sample median and as small otherwise. We make the same assumption as with the acquirer's size and define size as the market value of equity one month before the deal announcement[25]. $SmallSeller_i$ is a zero-one dummy variable, one if the asset seller is small, zero otherwise.

$C\&ISpread_i$ is the spread between the average rate charged for commercial and industrial loans and the fed funds rate in the previous quarter to the announcement date reported in the Federal Reserve's Survey of Terms of Business Lending. Harford (2005) argues that the C&I spread is a proxy for the overall liquidity or the ease of financing in the economy, and that it affects the market for corporate control[26].

We also include in all our models dummy variables that control for acquired assets industry fixed effects and deal announcement year fixed effects.

[25] Instead of a dummy variable we could have used a similar variable to acquirer's size, i.e. the logarithm of seller's market value. However, the correlation between our distress indicator and the logarithm of seller's market value is quite higher than with the small seller indicator, therefore we opt to use this measure to avoid multicollinearity issues in our regression analysis.

[26] In unreported results, alternatively to the C&I spread we used Schlingemann *et al.*'s (2002) liquidity index and obtained similar results. However, using the liquidity index leads us to lose a larger number of observations, thus we opt for the C&I spread.

4. Sample

4.1. Sample Construction

The sample is collected from Zephyr Bureau Van Dijk Database and is composed by completed asset acquisitions (assets, subsidiaries, divisions)[27] announced from January 1, 1997 to December 31, 2017, and between firms with a primary address in the United States of America[28]. We start in 1997 because is the first year available on Zephyr.

For a deal to be included in our sample, the following conditions have to be satisfied:

1) both sellers and acquirers are public listed firms at the time of the announcement and the assets sold/acquired unlisted;

2) at the announcement date[29] (event day 0) the acquirer has a minimum stock price of $2 and its stock is listed on AMEX, NASDAQ, or NYSE;

3) acquirer's adjusted stock prices are available on DataStream Database for the trading days for our longest event window around the announcement date [-10;+10];

4) the acquisition must be completed, the acquirer does not have any toehold position on the assets prior to deal announcement, and it acquires 100% stake of the assets;

5) None of the parties involved in a deal (acquirer/seller/assets) has a primary SIC code within 6000-6999 (Financial industry)[30];

6) in each deal is involved only one seller and one acquirer;

7) the seller has to have accounting information on DataStream for at least the previous fiscal year to the deal announcement; and

8) an acquirer cannot have announced another deal (acquisition/divestiture) within our longest event window, except when the deals have the same announcement date and they are all acquisitions from the same seller. In that case, we add the deal values and consider them as one deal only.

Moreover, deals within the same firm; that resulted on reverse mergers; asset exchanges; and due to bankruptcy processes are excluded from our sample. We exclude deals in which the selling firm is already in bankruptcy or in liquidation, because we are

[27] In our analysis we do not make any distinction among acquisitions of assets, subsidiaries, or divisions, as such we use the term asset acquisition (or sale) to denote an acquisition (or sale) of assets, subsidiaries, or divisions.

[28] We only require both acquiring and selling firms to have as primary address the United States of America, as such we have in our sample cross-border acquisitions, because, given that our focus is on acquisitions of divested assets, the assets acquired can be foreign.

[29] As Dinc *et al.* (2017), when the deal is announced on a weekend or holiday, we use as announcement date the nearest week day prior to the announcement.

[30] The exclusion of utilities does not affect our main conclusions.

interested in investigating asset fire sales in order to avoid bankruptcy and not in asset fires sales in which the firm is required to sell assets because it is already bankrupt.

We do not require a minimum deal value or a minimum relative size because since we are investigating fire sales the deal value may not represent the true value of the assets acquired. We also do not require the deal value or the method of payment to be disclosed at the announcement.

The main rationale of the sample criteria is to ensure that the deals are as comparable as possible. We require the sellers to be public to guarantee the reliability of the data and we exclude private sellers because their listing status may entail a different bargaining condition, and therefore affect the returns. Given that our distress definition is based on financial characteristics of the seller, having more than one seller would lead to the problem of defining the deal as distressed or non-distressed. Besides, having more than one seller could translate in a different bargaining position when compared to a deal that only has one, and the same applies to having more than one acquirer. Also, the percentage of stake acquired may influence the returns and Zephyr database does not provide information about each stake acquired when there are multiple acquirers.

As Fuller *et al.* (2002) and Masulis and Nahata (2011) we require a minimum stock price of $2 to limit the bid-ask bias[31]. We exclude clustered deals within our longest event window, because we cannot isolate the announcement effects of each deal. We require no toehold positions on the assets acquired in order to try to minimize the anticipatory effects of the acquisition and we exclude partial acquisitions because the economic benefits of partial acquisitions are more difficult to determine due to the high level of market anticipation (Masulis and Nahata, 2011).

To assemble our dataset, we collect the deal information from Zephyr, namely parties involved, their country code, SIC code, deal announcement date, method of payment, deal value[32]; all firms' accounting and market data from DataStream; and the C&I spread from the Board of Governors of the Federal Reserve System website[33]. Missing data was searched and collected from firm's electronic fillings on the Securities Exchange Commission's (SEC) EDGAR database[34]. We also use this last database to verify the exchange where acquirers' stock was listed at the deal announcement. When the exchange

[31] As with Masulis and Nahata (2011) imposing a minimum of $5 does not change our results, but it leads to fewer observations.
[32] When the deal value is not available in US dollars, we use the exchange rate at the announcement date.
[33] https://www.federalreserve.gov/releases/e2/e2chart.html, accessed on March 9th, 2018.
[34] https://www.sec.gov/edgar/searchedgar/companysearch.html, accessed on February and March 2018.

reported on Zephyr is different from the one on firm's SEC filings we use the data from this last source.

After applying all the criteria, our final sample yielded 1,115 deals, in which 381 (34%) deals are acquisitions of assets from distressed sellers (Distressed acquisitions) and 734 (66%) deals are acquisitions from non-distressed sellers (Non-Distressed acquisitions).

Panel A of table 1 shows the deals distribution by year. The deals distribution by year is quite balanced, the year with the highest number of deals is 2001 and it represents 9.1% of our sample. In 1997, 1998, and 1999 there is a small number of deals, but except for these years, 2017 is the year with the lowest number of deals, representing 2% of the sample. Considering distressed and non-distressed deals, their distribution is similar to the full sample and quite balanced, apart for some exceptions. In 2003 and 2009, there is a larger proportion of distressed than non-distressed, and unfortunately, we do not have any distressed acquisition in 1997 and 1998.

Panel B (table 1) shows the deals distribution by the industry of the assets acquired. In our sample, 42.3% of the deals are in the Manufacturing industry, 23.5% in Services, 17.5% in Transportation, Communication, Electric, Gas and Sanitary Services (Utilities), 9.6% in Retail and Wholesale, 6.7% in Mining and Construction, and 0.4% in Agriculture and Public Administration (Other). In terms of distressed and non-distressed acquisitions, they have similar distributions to the full sample, there is a slightly larger fraction of distressed acquisitions in the Services industry, compensated by a smaller one in the Utilities.

Table 1. Deals Distribution by Year and Industry

This table shows the deals distribution by year (Panel A) and by the Industry of the assets acquired (Panel B) for the full sample, and for Distressed and Non-Distressed acquisitions.

	All		Distressed		Non-Distressed	
	N	%	N	%	N	%
Panel A: Deals Distribution by Year						
1997	3	0.3%	0	0.0%	3	0.4%
1998	4	0.4%	0	0.0%	4	0.5%
1999	7	0.6%	3	0.8%	4	0.5%
2000	71	6.4%	23	6.0%	48	6.5%
2001	101	9.1%	35	9.2%	66	9.0%
2002	91	8.2%	44	11.5%	47	6.4%
2003	100	9.0%	54	14.2%	46	6.3%
2004	86	7.7%	26	6.8%	60	8.2%
2005	78	7.0%	26	6.8%	52	7.1%
2006	80	7.2%	18	4.7%	62	8.4%
2007	69	6.2%	19	5.0%	50	6.8%
2008	45	4.0%	15	3.9%	30	4.1%
2009	43	3.9%	23	6.0%	20	2.7%
2010	41	3.7%	14	3.7%	27	3.7%
2011	41	3.7%	9	2.4%	32	4.4%
2012	36	3.2%	8	2.1%	28	3.8%
2013	47	4.2%	11	2.9%	36	4.9%
2014	60	5.4%	17	4.5%	43	5.9%
2015	52	4.7%	15	3.9%	37	5.0%
2016	38	3.4%	15	3.9%	23	3.1%
2017	22	2.0%	6	1.6%	16	2.2%
Total	1,115	100.0%	381	34.2%	734	65.8%
Panel B: Deals Distribution by the Industry of the Assets Acquired						
Manufacturing	472	42.3%	157	41.2%	315	42.9%
Mining and Construction	75	6.7%	27	7.1%	48	6.5%
Retail and Wholesale	107	9.6%	34	8.9%	74	10.1%
Services	262	23.5%	104	27.3%	157	21.4%
Utilities	195	17.5%	57	15.0%	138	18.8%
Other	4	0.4%	2	0.5%	2	0.3%

4.2. Descriptive Statistics

Table 2 provides the descriptive statistics for our sample[35]. Sellers are larger than acquirers, the mean (median) seller size is $21.9 billion ($3 billion). The mean (median) acquirer size for the full sample is $11.3 billion ($1.7 billion). Considering the deal value and the relative deal size[36], the mean (median) deal size is $373 million ($67 million), the mean (median) relative deal size is 18.3% (4.5%).

Table 2. Descriptive Statistics for the Full Sample

This table shows the descriptive statistics for the full sample, all variables are defined on annex 3.

	Mean	Median	Std. Deviation	N
Acquirer Size ($ Million)	11,252	1,716	35,540	1114
Seller Size ($ Million)	21,932	2,954	57,597	1112
Seller Leverage (%)	30.7	28.2	24.4	1113
Deal Size ($ Million)	373	67	2,488	975
Relative Deal Size (%)	18.3	4.5	66.0	974
C&I spread (%)	2.41	2.36	0.415	1110
Core Assets Sold (%)	40.9	–	–	456
Related Industry (%)	43.9	–	–	490
Cross Border (%)	9.5	–	–	105
Undisclosed Deal Value (%)	24.7	–	–	287
Undisclosed Method of Payment (%)	41.4	–	–	462
All-Cash (%)	49.2	–	–	549
Equity (%)	9.3	–	–	104

In regard to the type of asset sold, in 59.1% of the sample the assets sold are non-core. The majority of assets acquired are from an unrelated industry, 56.1%; and only 9.5% of the assets acquired are from a foreign country.

Out of the 653 deals in which the method of payment was disclosed, 84% are all-cash deals, which is slightly lower than the 87% of Faccio *et al.* (2006), but higher than the 75% of Fuller *et al.* (2002) also for subsidiaries and the 70% of Slovin *et al.* (2005) for

[35] Each deal is considered independently. For example, according to our proxy for size the larger firm in our sample is involved in eleven deals as a seller and in three deals as an acquirer. Accordingly, as a seller its size is measured eleven times and three times as an acquirer, and all of them are then considered.

[36] In these two variables are included 147 deal values that we were able to find on firm's SEC filings.

divested assets; the remaining 16% involve equity as method of payment. In 287 (24.7%) deals the deal value was not disclosed and in 462 (41.4%) the method of payment was not disclosed. In regard to the latter, by searching on firm's SEC fillings we were able to find the method of payment of 322 (69.7%) deals: 96.9% were all-cash. Thus, even when the method of payment is not disclosed the great majority end-up being paid with all-cash.

Table 3 exhibits the descriptive statistics for distressed and non-distressed acquisitions. The firms involved in non-distressed deals are on average (and at the median) larger than the firms involved in distressed deals. The mean (median) acquirer size for distressed is $8.8 billion ($1.3 billion) and for non-distressed is $12.5 billion ($2 billion), the difference is significant at 10% (1%) level.

Table 3. Descriptive Statistics for Distressed and Non-Distressed Acquisitions

This table reports descriptive statistics for the Distressed and Non-Distressed samples. All variables are defined on annex 3. For the differences between the two samples, we performed the t-tests for means and the Wilcoxon rank-sum (Mann-Whitney) for medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

	Distressed			Non-Distressed		
	Mean	Median	N	Mean	Median	N
Acquirer Size ($ Million)	8,767	1,297	381	12,544*	1,966***	733
Seller Size ($ Million)	4,168	411	378	31,080***	5,874***	734
Seller Leverage (%)	35.8	32.7	380	28.1***	26.7***	733
Deal Value ($ Million)	160	43	350	492**	89***	625
Relative Deal Size (%)	18.4	3.1	350	18.2	5.4***	624
C&I Spread (%)	2.42	2.38	350	2.41	2.36	730
Core Assets Sold (%)	45.4	–	173	38.6**	–	283
Related Industry (%)	44.8	–	171	43.4	–	319
Cross Border (%)	7.3	–	28	10.5*	–	77
Undisclosed Deal Value (%)	21.5	–	82	27.9**	–	205
Undisclosed Method of Payment (%)	34.6	–	132	44.9***	–	330
All-Cash (%)	55.1	–	210	46.2***	–	339
Equity (%)	10.2	–	39	8.9	–	65

Non-distressed sellers are significantly larger than their distressed counterparts (p-value<0.01), which was expected. Whitaker (1999) finds a median industry-adjusted decline in firm's market value of equity in the first two years of distress of 46.76%. Also, as expected, similarly to Lasfer *et al.* (1996), distressed sellers rely more on debt financing than non-distressed sellers, both means and medians are statistically different at 1% level.

The mean (median) deal value is statistically larger for non-distressed acquisitions, however, the mean relative deal size is insignificantly higher for distressed acquisitions, mainly driven by the smaller size of acquirers in distressed deals. The median relative deal is significantly higher for non-distressed acquisitions.

Considering the type of assets being sold, both samples have the majority of deals as acquisitions of seller's non-core assets. However, there is a larger fraction of core-assets sold by distressed firms, the difference is statistically significant at 5% level. The results suggest that distressed sellers are more likely to sell core-assets than non-distressed sellers.

In terms of industry relatedness of the acquisition, both samples have the majority of deals as acquisitions of assets from unrelated industries. In regard to cross-border, there is a larger fraction of deals in the non-distressed than in the distressed sample (10.3% and 7.3%, respectively), and the difference is statistically significant at 10%.

In terms of deal value non-disclosure at the announcement, there is a significantly higher fraction of deals that did not disclose the deal value in the non-distressed sample[37].

Considering the method of payment, there is a larger fraction of deals with undisclosed method of payment in the non-distressed sample (a difference of 10 p.p.) that drives slightly the results making the fractions for distressed larger. However, out of the deals in which the method of payment was disclosed, the fraction of deals by method of payment is basically the same: around 84% for all-cash for both. When we consider the methods of payment that we were able to find on SEC's fillings, the fraction of deals remains quite similar to one another: all-cash 87.7% for distressed and 88.6% for non-distressed. By taking into consideration that is the higher percentage of undisclosed methods of payment in the non-distressed sample that makes the results statistically different, the results suggest that both types of acquisitions are as equally likely to be financed by all-cash.

[37] Out of the 82 deals in the distressed and of the 205 in the non-distressed samples with undisclosed deal value we were able to find 51 and 96, respectively.

5. Results

In this chapter we present our results, which are divided into three main sections, the first is the univariate analysis, the second one the multivariate analysis of the effect of distress on acquirer returns, and in the third we also perform a multivariate analysis but focusing on the effect of the deal value non-disclosure.

5.1. Univariate Analysis

5.1.1. Full Sample

Table 4 presents the results from the event study methodology applied to the full sample according to the three models used: Cumulative Returns, Market-Adjusted Model, and Market Model; and for three event windows considered: [-10;+10] (Panel A), [-10;+1] (Panel B), and [-1;+1] (Panel C).

Table 4. CARs for the Full Sample

This table shows the results from the event study methodology applied to the full sample. CR stands for Cumulative Returns, MAM for Market-Adjusted Model, and MM for Market Model. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

	CR	MAM	MM
Panel A: CARs for Event Window [-10;+10]			
Mean	1.91%***	1.80%***	1.75%***
Median	1.64%***	1.07%***	1.18%***
% Positive	57%	55%	55%
Panel B: CARs for Event Window [-10;+1]			
Mean	1.84%***	1.77%***	1.74%***
Median	1.48%***	1.03%***	0.93%***
% Positive	60%	57%	57%
Panel C: CARs for Event Window [-1;+1]			
Mean	1.42%***	1.41%***	1.41%***
Median	0.88%***	0.62%***	0.68%***
% Positive	59%	58%	57%
N	1,115	1,115	1,115

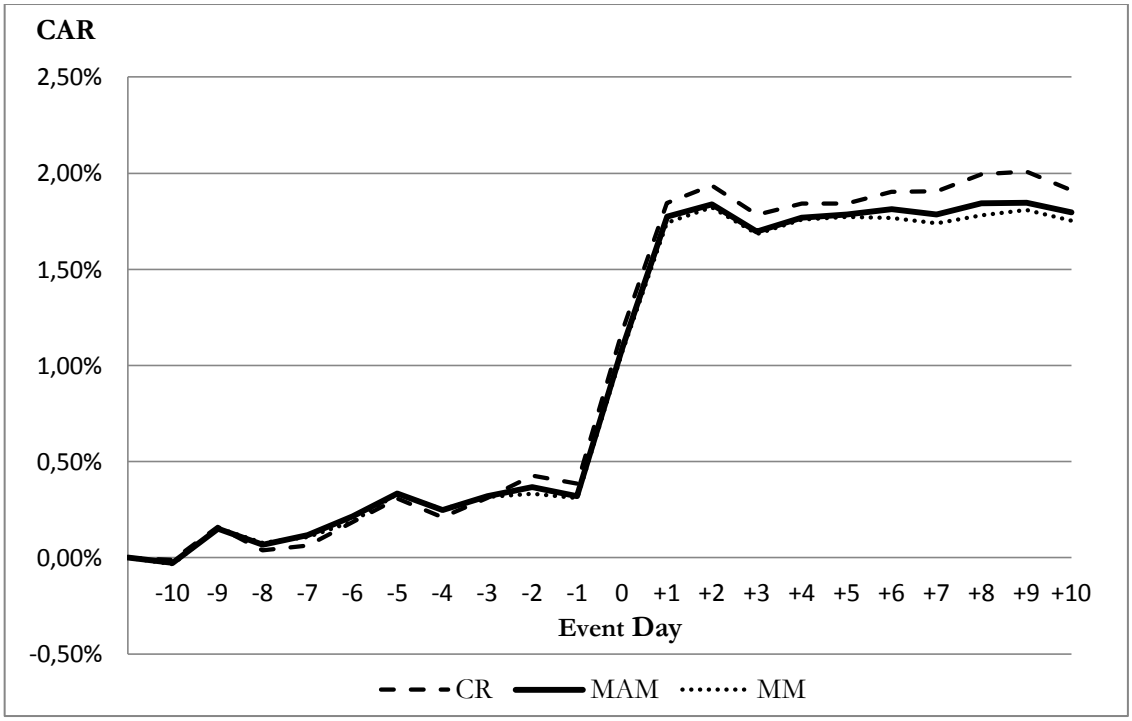
Consistent with previous studies (e.g. Chang, 1998; Fuller *et al.*, 2002; Faccio *et al.*, 2006) we find that acquisition of unlisted targets create value, the average CARs are positive and significant at 1% level for all event windows considered: [-10;+10], [-10;+1], and [-1;+1], and also for the three models used. In all models the CARs for our longest event window (Panel A) are higher than for the other event windows (Panel B and C), suggesting that, on average, the acquisitions were indeed value enhancing operations that created value for the shareholders and not a temporary effect.

Independently of the event window or the model used, the mean CARs are higher than the 0.50% reported by Sicherman and Pettway (1992), however smaller than Rosenfeld's (1984) 2.1% or Moeller *et al.*'s (2004) 2%.

The mean CARs for the entire window under analysis can be observed on figure 1. In all models, since the beginning of the event window and until the announcement day (event day 0) there is an increasingly positive return that is never completely erased. The CARs for the three models show similar behaviors for the entire window, although after the announcement day for the Cumulative Returns the CARs become slightly superior.

Figure 1. CARs for the 21-days event period centered on the announcement date for the full sample

This figure shows the CARs for the entire event window [-10;+10], for three different models. CR stands for Cumulative Returns, MAM for Market-Adjusted Model, and MM for Market Model.



5.1.2. Distressed versus Non-Distressed Acquisitions

In this sub-section we focus on the object of our study and show the results from the event study methodology by dividing the sample into distressed and non-distressed acquisitions. As formerly stated, distressed acquisitions are those in which assets are acquired from distressed sellers (i.e. those with negative earnings in the previous fiscal year to the sale announcement), and non-distressed acquisitions are those in which assets are acquired from non-distressed sellers (i.e. those with positive earnings in the previous fiscal year to the sale announcement).

Table 5 reports the results for the three models: Cumulative Returns, Market-Adjusted Model, and Market Model. For each model the results for distressed and non-distressed acquisitions are shown as well as the differences between the two samples. As with the results for the full sample, we have considered three event windows: [-10;+10] (Panel A); [-10;+1] (Panel B); and [-1;+1] (Panel C).

Similarly to the results for the full sample, the CARs for distressed and non-distressed acquisitions, for each model and for each event window are on average positive and statistically different from zero (p-value<0.01). For distressed, as for the full sample, we find higher returns for event window [-10;+10] (Panel A). For non-distressed however, except for Cumulative Returns, the highest returns are for event window [-10;+1] (Panel B), which suggests that on average the value created with the acquisition was slightly erased after event day 1.

The results show that for each of the models and for each of the event windows considered, the mean CAR is higher for distressed acquisitions than for non-distressed, suggesting that acquisitions of assets from distressed sellers create more value than acquisitions of assets from non-distressed sellers. However, we do not find statistically significant differences between the CARs of distressed and non-distressed acquisitions for Cumulative Returns or for event window [-1;+1] (Panel C) in any model.

For event window [-10;+10] (Panel A), the difference is statistically significant for the Market Model at 10% level, for both mean and median CARs. As for event window [-10;+1] (Panel B), the difference between the mean CARs is statistically significant at 10% level for the Market-Adjusted Model and for the Market Model, and between the median CARs is also statistically significant for both, but at 5% level.

Table 5. CARs for Distressed and Non-Distressed Acquisitions

This table shows the results from the event study methodology applied to the Distressed and Non-Distressed samples. Distressed represents acquisitions of assets from distressed sellers and Non-Distressed represents acquisitions of assets from non-distressed sellers. Diff. stands for the difference between the Distressed and the Non-Distressed samples. For means we performed T-tests, for medians we performed Wilcoxon signed rank tests, and Wilcoxon rank-sum (Mann-Whitney) tests for the differences between medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

	Cumulative Returns			Market-Adjusted Model			Market Model		
	Distressed	Non-Distressed	Diff.	Distressed	Non-Distressed	Diff.	Distressed	Non-Distressed	Diff.
Panel A: CARs for Event Window [-10;+10]									
Mean	2.46%***	1.63%***	0.83 p.p.	2.63%***	1.36%***	1.27 p.p.	2.69%***	1.27%***	1.42* p.p.
Median	1.66%***	1.63%***	0.03 p.p.	1.95%***	0.79%***	1.16 p.p.	2.23%***	0.56%***	1.68* p.p.
% Positive	57%	56%		58%	53%		59%	53%	
Panel B: CARs for Event Window [-10;+1]									
Mean	2.33%***	1.59%***	0.74 p.p.	2.49%***	1.40%***	1.08* p.p.	2.47%***	1.36%***	1.11* p.p.
Median	1.57%***	1.36%***	0.21 p.p.	1.64%***	0.75%***	0.89** p.p.	1.58%***	0.58%***	1.00** p.p.
% Positive	61%	59%		60%	56%		60%	55%	
Panel C: CARs for Event Window [-1;+1]									
Mean	1.58%***	1.33%***	0.25 p.p.	1.71%***	1.25%***	0.46 p.p.	1.72%***	1.25%***	0.48 p.p.
Median	0.70%***	0.99%***	-0.29 p.p.	0.62%***	0.67%***	-0.05 p.p.	0.67%***	0.69%***	-0.01 p.p.
% Positive	56%	60%		57%	58%		58%	57%	
N	381	734		381	734		381	734	

As such, our hypothesis that acquisitions of divested assets from distressed sellers lead to higher returns for the acquiring firms than acquisitions of assets from non-distressed sellers is supported by our findings for the Market-Adjusted Model and the Market Model for event window [-10;+1]; and event window [-10;+10] for the Market Model. These results suggest that, on average, fire sales of heterogeneous real assets exist.

On figure 2 the mean CARs for the whole event window and for the three different models can be observed: fig. 2a) for Cumulative Returns, fig. 2b) for Market-Adjusted Model, and fig. 2c) for Market Model. As with the full sample, the mean CARs behavior shows similarities across the three different models, despite the similarities being higher for the Market-Adjusted Model and the Market Model.

In all models, the mean CARs for the distressed and the non-distressed samples show different behaviors both in the preceding as in the following days to the announcement day (event day 0).

Figure 2. CARs for the 21-days event period centered on the announcement date for Distressed and Non-Distressed acquisitions

This figure shows the CARs for the entire event window [-10;+10], for three different models. The figure is divided into three different figures, fig. 2a) for Cumulative Returns (CR), fig. 2b) for Market-Adjusted Model (MAM), and fig. 2c) for Market Model (MM).

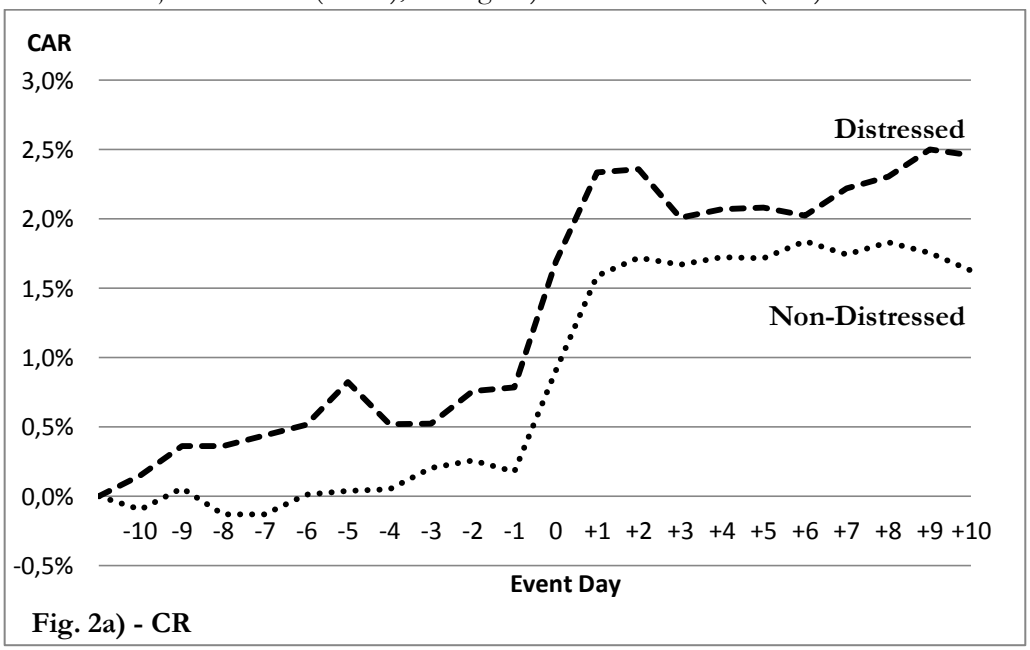


Fig. 2a) - CR

(Continues on the next page)

(Continuation of figure 2)

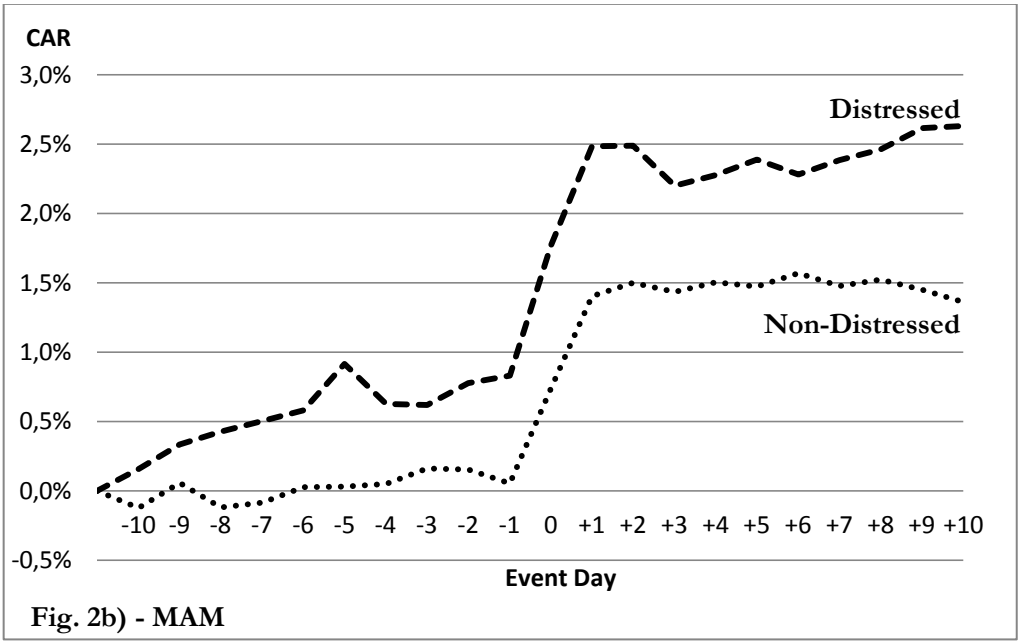


Fig. 2b) - MAM

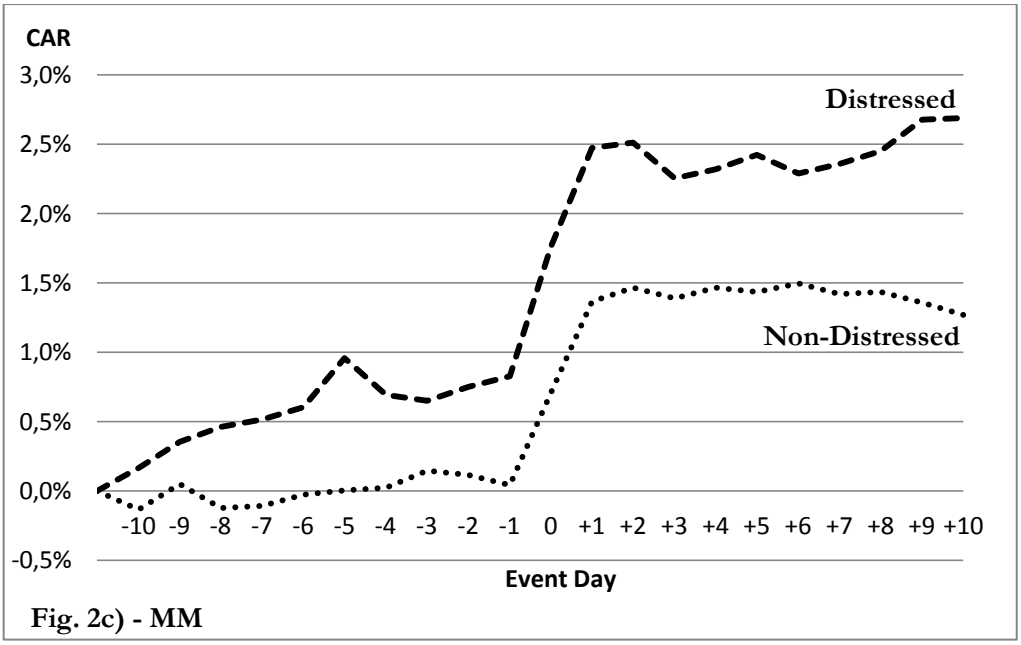


Fig. 2c) - MM

Concerning the days following the announcement, for the non-distressed sample the mean CARs behavior is quite stable, decreasing slightly in the last days of the event window. Whereas for the distressed sample, the mean CARs decrease to increase again reaching the highest values at end of the event window.

In regard to the preceding days to the announcement day, it is in this set of days, namely [-10;-2], that we find the most interesting differences between the mean CARs behaviors. For non-distressed acquisitions the pre-announcement CAR is positive but

insignificant in all models, in fact, except for Cumulative Returns (fig. 2a), there is barely a sustainable and noticeable increase in the CARs especially when compared to the mean CARs for distressed acquisitions that keeps increasing (except on day 4). For distressed deals, the CARs for these preceding days are positive and statistically significant at 10% level for the three models, the median CAR is also statistically significant for the three models at 5% level. The difference between median CARs for distressed and non-distressed acquisitions is statistically significant at 10% level for the Market and Market-Adjusted Models[38].

The results suggest different anticipatory behaviors by the market depending on whether it is a distressed or a non-distressed acquisition. There are possible reasons for these different anticipatory behaviors, which are not mutually exclusive:

1) Leakage of information or rumors. It might be that there was more leakage of information or rumors concerning the announcements of acquisitions of assets from distressed sellers than of acquisitions of assets from non-distressed sellers;

2) Toehold positions on distressed sellers. According to Shleifer and Vishny's (1986) model, the larger the toehold the greater is the likelihood of an offer. In the sample selection we require no toehold positions on the assets acquired, however, Zephyr database does not consider indirect ownership. As such, if an acquirer has a toehold position on the seller, Zephyr does not consider it to also have toehold positions on the seller's assets. Therefore, it is possible that for distressed acquisitions, the acquirers had toehold positions on the sellers and because the sellers are in distress, it becomes more likely that they will have to sell assets to raise funds, and this likelihood starts to be incorporated by the market on the stock prices of acquirers with toehold positions; and finally,

3) The seller's financial condition. The pre-announcement stock run-up may be due to the fact that the seller is in distress. And as the likelihood of a distressed firm to sell assets increases, it is incorporated by other firms due to the possibility of acquiring assets at a better pricing. However, for this to be true other firms in the market would also have shown a stock run-up that would be erased after the deal announcement.

[38] These results can be found on annex 4.

5.1.3. CARs by Deal Value (Un)Disclosed, Method of Payment, and Type of Asset Sold

The results from the previous sub-section show that, on average, there are differences on how the market reacts to the announcement of a distressed and non-distressed acquisition. We find that, on average, distressed yield higher returns than non-distressed acquisitions, and the returns are statistically different for the event window [-10;+1] for both models of expected returns. We also find that there is a statistically significant positive pre-announcement stock run-up for distressed while for non-distressed acquisitions it is positive but insignificant (the difference between medians is statistically significant at 5% level, for both models of expected returns). Given these differences, all the results provided in this sub-section are for the event window [-10;+1] and for the Market-Adjusted Model.

We focus on the deal value (non-)disclosure, the method of payment, and the type of asset being sold by the selling firm (i.e. core and non-core assets) in order to assess the market reaction depending on whether it is a distressed or non-distressed acquisition[39].

5.1.3.1. Deal Value (Un)Disclosed

Previous studies (e.g. Klein, 1986; Sicherman and Pettway, 1992; Martynova and Renneboog; 2011) have shown that disclosing and not disclosing the deal value at the announcement affects differently the returns independently of who is under study, the seller or the acquirer. As such, we study how the disclosure and non-disclosure of deal value affects the CARs and whether it is different when it is a distressed or a non-distressed acquisition.

Consistent with previous work, the results (displayed on 6) show that for the full sample the returns are higher when the deal value is disclosed, although not statistically different from when undisclosed. For non-distressed acquisitions, as in Sicherman and Pettway (1992), the returns are significant (p-value<0.01) and statistically higher when the

[39] Despite not reported, we also analysed the returns focusing on the industry relatedness of the acquisition. The returns for acquisitions of assets from related industries are not statistically different depending on whether it is a distressed or non-distressed acquisition. Also, according to Shleifer and Vishny's (1992) model and to the findings of Pulvino (1998) and Ellul *et al.* (2011) the fire sale discount is higher when the acquirer of assets from a distressed seller is an industry outsider. Therefore, we also analysed the returns taking this into consideration. We initially defined as industry outsiders acquirers that did not share the 1-digit SIC code with the asset, and the returns between distressed and non-distressed acquisitions are not statistically different. We then used a broader definition of industry outsider, defining it as acquirers that did not share the same 2-digit SIC code, and the difference between the returns remained insignificant.

deal value is disclosed, when not disclosed the returns are insignificant. For distressed acquisitions, however, the returns are in both cases highly significant (p-value<0.01) and higher when the deal value is not disclosed, but not statistically different.

Table 6. CARs by Deal Value (Un)Disclosed

This table reports the cumulative abnormal returns for acquirers of assets by Deal Value Disclosed and Undisclosed at the announcement. Distressed represents acquisitions of assets from distressed sellers and Non-Distr. represents acquisitions of assets from non-distressed sellers. The last column reports the differences between Distressed and Non-Distressed samples. CARs were estimated through the Market-Adjusted Model for the event window [-10;+1]. For means we performed T-tests, for medians we performed Wilcoxon signed rank tests, and Wilcoxon rank-sum (Mann-Whitney) tests for the differences between medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

		All	Distressed (1)	Non-Distr. (2)	Diff. (1-2)
Deal Value Disclosed (3)	Mean	2.07%***	2.19%***	2.00%***	0.19 p.p.
	Med.	1.14%***	0.96%***	1.38%***	-0.42 p.p.
	N	828	299	529	
Deal Value Undisclosed (4)	Mean	0.95%*	3.58%***	-0.13%	3.71*** p.p.
	Med.	0.79%**	3.09%***	0.31%	2.78*** p.p.
	N	287	82	205	
Diff. D.V.Disc – D.V. Und. (3-4)	Mean	1.12 p.p.	-1.39 p.p.	2.13*** p.p.	
	Med.	0.35 p.p.	-2.13 p.p.	1.07** p.p.	

According to Milgrom's (1981) model, given incomplete information, not disclosing all information leads the uninformed to rationally expect this information to be unfavorable. Thus, not disclosing the amount paid for the assets would be interpreted by the market as the acquirer overpaying for the assets.

Our results are consistent with not disclosing the deal value being interpreted as unfavorable information for the acquirer only when the seller is not in distress. When the seller is in distress, not disclosing the deal value is interpreted as favorable information for the acquirer. Indeed, while for non-distressed acquisitions when the deal value is not disclosed both mean and median CARs are insignificant (-0.13% and 0.31%, respectively), for distressed acquisitions they are both positive and significant at 1% level (3.58% and 3.09%, respectively), the differences between means, and medians CARs for distressed and non-distressed acquisitions are significant at 1% level.

Given that in any deal there are two sides: the acquirer and the seller, the undisclosed information may be interpreted by the market as unfavorable to only one of the parties[40]. The market may interpret the lack of deal value disclosure when the seller is distressed as unfavorable for the selling firm, and consequently as favorable for the acquiring firm. Meaning that when the selling firm is in distress and the deal value is not disclosed the market may interpret the acquisition at a fire sale discount.

The results suggest that the interpretation of fire sale discounts only happens when the deal value is not disclosed. When the deal value is disclosed, the returns for distressed and non-distressed acquisitions are both highly significant (p-value<0.01) but not statistically different from each other. For non-distressed the mean (median) CAR is 2.00% (1.38%) and for distressed acquisitions is 2.19% (0.96%).

Therefore, the results suggest that fire sales exist because investors believe that they exist, by assessing only the deals that they do not know the deal value as acquisitions at fire sale discounts, given that, on average, investors do not assess acquisitions with disclosed deal value as more value creating when the seller is in distress. However, when they do not know the deal value they assume that acquiring divested assets from distressed sellers is made at favorable conditions (i.e. at fire sale discounts), and thus, interpret this type of acquisitions as more value creating.

5.1.3.2. Method of Payment

As mentioned in the literature review, previous studies have shown that the method of payment is one of the most important determinants of acquirer returns.

Contrarily to what has been observed in acquisitions of public targets, in acquisitions of unlisted targets (stand-alone firms, subsidiaries only, and divested assets) it has been found that when the method of payment involves equity the returns are higher than those with all-cash (e.g. Chang 1998; Moeller *et al.*, 2004; Slovin *et al.*, 2005; Faccio *et al.*, 2006). However, distressed sellers are more likely to sell assets for cash and the need for liquidity may make them accept higher price discounts (Shleifer and Vishny, 1992; Officer, 2007),

[40] Sicherman and Pettway (1992) find that when the deal value is not disclosed the returns for non-downgraded sellers are positive and significant (although smaller than when the deal value is disclosed), for the acquirers of those same assets the returns are insignificant. For the downgraded sub-samples, the returns are insignificant for both sellers and acquirers, possibly because in the downgraded sample are included sellers that are not in distress.

therefore, we analyse if the method of payment influences the returns depending on whether it is a distressed or a non-distressed acquisition.

In our analysis we also include undisclosed methods of payment. However, given the results in the previous sub-section considering the deal value non-disclosure, we divide the undisclosed method of payment category into two distinct ones: undisclosed method of payment and undisclosed terms. The undisclosed method of payment represents deals in which only the method of payment was not disclosed, and undisclosed terms represents deals in which both method of payment and deal value were not disclosed. As such, the analysis is divided into four different categories of method of payment.

Table 7 exhibits the CARs according to the method of payment. For the full sample, similarly to Martynova and Renneboog (2011), we find insignificant mean returns for acquisitions with undisclosed terms and as in their study it is this set of acquisitions that yields the lowest returns (0.76%). For the remaining methods of payments we find significant positive returns regardless the method of payment, which is consistent with Moeller *et al.* (2004) and Faccio *et al.* (2006) results for subsidiaries.

In line with Slovin *et al.* (2005), we find that acquisitions of divested assets with equity yield the highest returns, the mean CAR for acquisitions involving equity is 3.22%, in theirs is 9.77%. Considering all-cash acquisitions, the mean CAR for their sample is negative but insignificant (-0.30%), for ours is positive and highly significant (p-value<0.01), 1.85%.

The non-disclosure of method of payment only does not seem to influence as negatively the returns as when the deal value is not disclosed, since the mean CAR is 2.10% and highly significant (p-value<0.01). Given that acquisitions of divested assets are typically acquired with all-cash as method of payment[41], the market may interpret this type of acquisitions as such. Indeed, not only the range of returns is quite similar, but also the great majority was in fact paid in all-cash[42].

The results for non-distressed are in line with the full sample and consequently with previous work, however, the same is not observed for distressed acquisitions.

[41] In Fuller *et al.* (2002) 75% of the subsidiary sample was acquired with all-cash, in Faccio *et al.* (2006) 87%, and in Officer (2007) 94%. Slovin *et al.* (2005) reports 70% for divested assets.
[42] Out of the 208 deals, we were able to find on firm's SEC fillings 191 (91.8%), 186 (97.4%) were paid in all-cash.

Table 7. CARs by Method of Payment

This table reports the cumulative abnormal returns by method of payment: all-cash, equity, undisclosed method of payment (when only the method of payment was not disclosed), and undisclosed terms (when both the method of payment and the deal value were not disclosed). Distressed represents acquisitions of assets from distressed sellers and Non-Distr. represents acquisitions of assets from non-distressed sellers. The last column reports the differences between Distressed and Non-Distressed samples. Variables are defined on annex 3. CARs were estimated through the Market-Adjusted Model for the event window [-10;+1]. For means we performed T-tests, for medians we performed Wilcoxon signed rank tests, and Wilcoxon rank-sum (Mann-Whitney) tests for the differences between medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

		All	Distressed (1)	Non-Distr. (2)	Diff. (1-2)
All-Cash (3)	Mean	1.85%***	2.51%***	1.43%***	1.08 p.p.
	Med.	1.10%***	1.40%***	0.85%***	0.55 p.p.
	N	549	210	339	
Equity (4)	Mean	3.22%**	-0.30%	5.33%***	-5.63* p.p.
	Med.	1.03%*	-0.18%	2.08%**	-2.26 p.p.
	N	104	39	65	
Undisclosed Method of Payment (5)	Mean	2.10%***	2.77%***	1.79%**	0.98 p.p.
	Med.	1.31%***	1.43%***	1.26%***	0.17 p.p.
	N	208	65	143	
Undisclosed Terms (6)	Mean	0.76%	3.75%***	-0.31%	4.06*** p.p.
	Med.	0.63%*	3.25%***	0.11%	3.14*** p.p.
	N	254	67	187	
Diff. All-Cash - Und. Terms (3-6)	Mean	1.09 p.p.	-1.24 p.p.	1.74** p.p.	
	Med.	0.47 p.p.	-1.85 p.p.	0.96* p.p.	
Diff. Equity - Und. Terms (4-6)	Mean	2.46* p.p.	-4.05 p.p.	5.64*** p.p.	
	Med.	0.40 p.p.	-3.43* p.p.	1.97** p.p.	
Diff. Und. M. P. - Und. Terms (5-6)	Mean	1.34 p.p.	-0.98 p.p.	2.10** p.p.	
	Med.	0.47 p.p.	-1.82 p.p.	1.37** p.p.	

We find the highest returns in distressed acquisitions for deals with undisclosed terms, which are statistically different from non-distressed acquisitions (p-value<0.01)[43]; and the lowest returns for distressed acquisitions when the method of payment involves equity. For this last set of acquisitions, the returns are not only insignificantly different from zero[44], but also the mean CAR is statistically different from non-distressed at 10% level. Considering all-cash and when the method of payment only is not disclosed, despite not statistically different, the mean CARs are around 1 p.p. higher for distressed acquisitions.

The results suggest that the method of payment plays an important role on the market's interpretation of fire sale discounts and are consistent with the argument that distressed sellers are more likely to sell assets for cash and the need for liquidity would make them accept higher price discounts (Shleifer and Vishny, 1992; Officer, 2007).

In distressed acquisitions, when the method of payment is announced to be all-cash the mean CAR is 2.51% (p-value<0.01) and when not disclosed the mean CAR is also positive and highly significant (2.77%, p-value<0.01), possibly because the market assumes that the acquisition is going to be financed by all-cash. However, when the method of payment announced involves equity the mean CAR in distressed acquisitions is insignificant (-0.30%). Possibly, the market interprets the willingness of a distressed seller to accept equity as a signal that the firm is able to obtain a larger amount of funds by monetizing the stake received, despite the transaction costs, than if the method of payment was all-cash, and therefore a fire sale becomes less likely. Also, the positive signal conveyed by the acceptance of buyer's equity by the seller argued by Slovin *et al.* (2005) may not happen in a distressed acquisition, because, due to its necessity for funds, the market may assume that a distressed seller will sell the stake received rather sooner than a non-distressed seller. And thus, it will not benefit from the future performance of the acquirer, which could explain the different reactions in distressed and non-distressed acquisitions when the method of payment involves equity.

Overall, the results suggest that in distressed acquisitions more obscure deals (i.e. deals with undisclosed terms) lead to higher positive returns, the less is known about the distressed deal the better the reaction; and that the perception of fire sales is more likely when acquiring assets from distressed sellers as long the method of payment does not

[43] This result is mainly driven by the deal value non-disclosure, despite not being the same sub-samples it is above 80% of the deals.
[44] The CARs remain insignificant if we exclude the methods of payment classified as "other".

involve equity. As such, when the deal is announced the market reacts according to the method of payment.

5.1.3.3. Type of Asset Sold

As formerly mentioned, according to the literature there are different possible explanations for the motivation to sell assets other than to raise funds. Fuller *et al.* (2002) suggest that the *focusing hypothesis* could imply that a firm may be willing to sell non-core assets at relatively lower prices than core assets. Also, Schlingemann *et al.* (2002) show that firms try to avoid asset sales in illiquid markets, which implies that if the firm is not in distress it may postpone the asset sale. They also show that firms are more likely to sell core assets when the market is relatively more liquid, meaning that the assets can be sold faster without a discount. Therefore, we analyse if the type of asset being sold influences the returns depending on whether it is a distressed or a non-distressed acquisition.

Table 8 shows the results according to the type of asset being sold: core and non-core. As in Fuller *et al.* (2002) for subsidiaries, the CARs for the full sample are not statistically different, but contrarily to their results we find a higher mean CAR for acquisitions of core assets: 2.35% for acquisitions of core and 1.37% for non-core assets (p-value<0.01, for both).

Similarly to the full sample, for non-distressed the mean returns are higher for acquisitions of core assets than for non-core assets, but the differences between mean, and median CARs are significant at 5% level, which suggests that non-distressed firms are able to sell non-core assets at relatively higher prices than core assets. For distressed acquisitions and contrarily to non-distressed, we find higher CARs for acquisitions of sellers' non-core assets, the median CARs are statistically different at 10% level, suggesting that distressed firms sell non-core assets at relatively lower prices than core assets.

According to the *liquidity hypothesis*, firms try to avoid asset sales in illiquid markets, which implies that if the firm has financial flexibility (i.e. it is not in distress) it may postpone the asset sale. Therefore, when a non-distressed firm decides to sell non-core assets to focus on its core business (the *focusing hypothesis*) it may be able to postpone the sale until is able to find an acquirer willing to pay a high premium for them (the *efficiency hypothesis*). Due to this financial flexibility, a non-distressed firm may be able to sell non-core assets at relatively higher prices than core assets, which could explain the significantly lower returns in non-distressed acquisitions of non-core assets. Distressed firms however,

may not have this financial flexibility to postpone the asset sale, also Schlingemann *et al.* (2002) find that firms are more likely to sell core assets when the market is relatively more liquid. Thus, to ease its financial situation a distressed firm may have to sell non-core assets at relatively lower prices than core assets, which could explain the significantly higher median returns in distressed acquisitions of seller's non-core assets.

Table 8. CARs by Type of Asset Sold

This table reports the cumulative abnormal returns for acquirers by the type of asset being sold: Core and Non-Core. As Fuller *et al.* (2002), we define as core assets those that have the same 3-digit SIC code as the seller's, and as non-core otherwise. Distressed represents acquisitions of assets from distressed sellers and Non-Distr. represents acquisitions of assets from non-distressed sellers. The last column reports the differences between Distressed and Non-Distressed samples. CARs were estimated through the Market-Adjusted Model for the event window [-10;+1]. For means we performed T-tests, for medians we performed Wilcoxon signed rank tests, and Wilcoxon rank-sum (Mann-Whitney) tests for the differences between medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

		All	Distressed (1)	Non-Distr. (2)	Diff. (1-2)
Core Assets (3)	Mean	2.35%***	2.39%**	2.33%***	0.06 p.p.
	Med.	0.93%***	0.85%*	1.03%***	-0.18 p.p.
	N	456	173	283	
Non-Core Assets (4)	Mean	1.37%***	2.57%***	0.82%*	1.75** p.p.
	Med.	1.14%***	2.65%***	0.38%*	2.27*** p.p.
	N	659	208	451	
Diff. Core A. - Non-Core A.	Mean	0.98 p.p.	-0.18 p.p.	1.51** p.p.	
(3-4)	Med.	-0.21 p.p.	-1.80* p.p.	0.65** p.p.	

Our results suggest that the market reacts differently when the acquisition of non-core assets is from a distressed or from a non-distressed seller[45] and are consistent with the view that only distressed firms sell non-core assets at lower prices. Possibly, given that a distressed seller may not have the financial flexibility of a non-distressed seller to postpone the sale of its non-core assets, the market may interpret this type of acquisition as more likely to be done at fire sale discounts, and, as such, assesses them as more value creating.

[45] For acquisitions of seller's non-core assets the mean (median) CARs is statistically higher for distressed acquisitions at 5% (1%) level, for acquisitions of seller's core assets the CARs are not statistically different from each other. However, in unreported results when we focus on deals with undisclosed deal value only, for both acquisitions of core and non-core assets the differences between CARs are statistically higher for distressed deals.

5.2. The effect of Distress – Multivariate Analysis

In the previous section we analyse the returns using univariate comparisons, in this one we perform multivariate analysis of acquirer returns controlling for factors that have been shown by the literature to influence acquirer returns.

The results from the univariate analysis suggest that the market reacts differently depending on whether it is a distressed or a non-distressed deal in acquisitions of seller's non-core assets, and when the method of payment involves equity. As such, in our regression analysis we take into consideration these possible differences[46].

In sub-section 3.2.2., we introduced model (3.6), which we use as our base model for the regressions, although with some variations. In all regressions we control for the type of asset being sold, but in the second and third regressions of each panel we also include an interaction term to isolate the effect of the type of asset being sold (regressions 2, 4, 6, and 7). In Panel A we include all deals, in Panel B we account for the different reactions when the method of payment does and does not involve equity, as such we exclude deals with this method of payment. In Panel C, we once again include all deals, but differently from Panel A, we also include interaction terms to isolate the effect of the method of payment.

Table 9 (Panels A, B, and C) displays the regressions' results. In Panel A, as expected the Distress coefficient is positive, however insignificant in both regressions, even after isolating the effect of acquiring distressed seller's core assets through the interaction Distress*CoreAssets (regression 2).

In Panel B, with the exclusion of deals in which the method of payment involves equity, the positive coefficient of Distress becomes significant in both regressions. In regression 3, Distress is significant at 5% level. In regression 4, due to the inclusion of the interaction Distress*CoreAssets, the effect on CAR of acquiring distressed seller's non-core assets is given by the variable Distress, its coefficient increases and becomes significant at 1% level. For the interaction Distress*CoreAssets, we find a significant negative coefficient (p-value<0.05), which is higher than the coefficient of the variable Distress. For this panel of deals, given that the coefficient of Distress*CoreAssets overcomes the coefficient of Distress, the results suggest that acquirers experience higher returns only when acquiring distressed sellers' non-core assets.

[46] The results also suggest that deal value non-disclosure is assessed differently, we focus on this issue in the next sub-section.

Table 9. OLS Regression Analysis of CAR: The effect of Distress

This table provides the OLS regressions of CAR. In all regressions the dependent variable is CAR for event window [-10;+1], estimated through the Market-Adjusted Model. In panel A and C all deals are included, and in Panel B deals with equity as method of payment are excluded. All variables are defined on annex 3. In all regressions we include dummy variables that control for assets acquired industry fixed effects and year fixed effects. For each variable, we list the coefficient and in parenthesis the heteroskedasticity-corrected standard errors. ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively. The statistically significant coefficients are denoted in bold.

	Panel A (All)		Panel B (w/o Equity)		Panel C (All)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Distress	0.006	0.015	**0.014****	**0.026*****	**0.013***	**0.023*****	-0.016
	(0.007)	(0.009)	(0.007)	(0.009)	(0.007)	(0.009)	(0.011)
Distress*Equity					**-0.066****	**-0.069****	
					(0.032)	(0.032)	
Distress*CoreAssets		-0.020		**-0.027****		**-0.022***	
		(0.014)		(0.013)		(0.013)	
Equity	0.000	-0.000			0.025	0.005	
	(0.016)	(0.016)			(0.020)	(0.023)	
CoreAssets	0.007	**0.015***	-0.001	0.009	0.007	0.009	
	(0.007)	(0.009)	(0.007)	(0.008)	(0.007)	(0.008)	
Equity*CoreAssets						**0.054***	
						(0.031)	
Distress*NonEquity* NonCoreAssets							**0.043*****
							(0.014)
NonEquity							0.009
							(0.016)
NonCoreAssets							**0.021****
							(0.009)
RelatedIndustry	**0.011***	0.011	**0.012***	**0.012***	**0.011***	0.011	0.011
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
RelativeSize	**0.044*****	**0.045*****	**0.048*****	**0.049*****	**0.044*****	**0.044*****	**0.045*****
	(0.006)	(0.006)	(0.005)	(0.004)	(0.006)	(0.007)	(0.006)
Size	**-0.007*****	**-0.007*****	**-0.006*****	**-0.006*****	**-0.007*****	**-0.007*****	**-0.007*****
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
CrossBorder	0.012	0.012	0.014	**0.014***	0.012	0.011	0.012
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
SmallSeller	-0.004	-0.005	-0.005	-0.005	-0.003	-0.002	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
C&ISpread	-0.008	-0.008	-0.003	-0.002	-0.008	-0.009	-0.006
	(0.022)	(0.023)	(0.022)	(0.022)	(0.023)	(0.022)	(0.023)
Intercept	-0.007	-0.009	-0.030	-0.034	-0.013	-0.014	-0.015
	(0.062)	(0.063)	(0.063)	(0.064)	(0.062)	(0.063)	(0.065)
Adjusted R^2	9.1%	9.2%	12.0%	12.3%	9.8%	10.5%	10.0%
Industry and Year FF	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F – Statistic	3.830***	3.786***	4.557***	4.562***	4.008***	4.051***	4.057***
N	967	967	863	863	967	967	967

Considering Panel C, in regression 5 due to the interaction term Distress*Equity, the effect of acquiring assets from a distressed seller when the method of payment does not involve equity is represented by the variable Distress. Consistent with regression 3, the coefficient of Distress is positive and significant (p-value<0.06). In regard to Distress*Equity, we find a significant negative effect on CAR when the method of payment used in an acquisition of assets from a distressed seller involves equity (p-value<0.05), and its coefficient is higher than the coefficient of the variable Distress. This suggests lower returns in acquisitions from distressed sellers when equity is used as method of payment.

In regression 6, we include several interaction terms in order to isolate the effects of the method of payment and the type of asset sold by the selling firm. Consistent with the previous regressions, for the interactions Distress*Equity and Distress*CoreAssets, we find negative coefficients, significant at 5% and 10% levels, respectively. Due to these interactions, acquisitions of distressed sellers' non-core assets without equity are represented by the variable Distress. Consistent with regression 4, its coefficient is positive and significant at 1% level.

Overall, for distressed acquisitions there is a statistically significant negative impact on CAR when the method of payment involves equity, and a statistically significant positive impact on CAR that is driven by acquisitions of non-core assets, given that we find a statistically significant negative effect for acquisitions of core assets. Thus, the results suggest that the higher returns in acquisitions of assets from distressed sellers are limited to acquisitions of seller's non-core assets when the method of payment does not involve equity.

We test and confirm these results in regression 7. For this regression we include the interaction term Distress*NonEquity*NonCoreAssets that captures the impact of acquiring distressed seller's non-core assets without equity. As such, all other distressed acquisitions are represented by the variable Distressed. We find a negative and insignificant coefficient for the variable Distress, suggesting that the impact on CAR is not statistically different from non-distressed acquisitions. And for Distress*NonEquity*NonCoreAssets we find a positive coefficient, significant at 1% level. As such, the results suggest that, indeed, the higher returns in acquisitions of assets from distressed sellers are limited to those acquisitions that the market may interpret as more likely to be a fire sale, i.e.

acquisitions of seller's non-core assets when the method of payment does not involve equity[47].

Regarding non-distressed acquisitions, the overall results suggest that the impacts on CAR of the method of payment and of the type of asset sold (i.e., core and non-core assets) are not statistically different from one another, except in acquisitions of core assets with equity. Given that, in regression 6, the interaction between Equity*CoreAssets has a positive and significant coefficient at 10% level, suggesting that when acquiring core assets from non-distressed sellers the returns are higher when the method of payment involves equity.

Finally, in regard to the control variables, the evidence confirms the findings of Moeller *et al.* (2004) and suggests that larger acquirers experience lower returns, in all regressions the variable Size has a negative and statistically significant coefficient (p-value<0.01). Also in line with previous work (e.g. Fuller *et al.*, 2002; Slovin *et al.*, 2005; Masulis and Nahata, 2011) we find that the relative deal size in acquisitions of unlisted targets has a positive and significant effect on CAR (p-value<0.01 in all regressions), suggesting that as the relative size of the deal increases so do the acquirers' returns. We also find positive and significant coefficients for acquisitions in related industries in regressions 1, 3, 4 and 5, and for cross-border acquisitions in regression 4 (p-value<0.10 for all coefficients).

5.3. The effect of Deal Value Non-disclosure – Multivariate Analysis

The results from the univariate analysis indicate that the deal value non-disclosure is assessed differently by the market depending on whether the acquisition of assets is from a distressed or a non-distressed seller. Specifically, we find that when the deal value is undisclosed the returns for acquisitions of assets from distressed sellers are positive and highly significant, whereas when from non-distressed sellers the returns are insignificantly negative, the difference between the mean (and median) CARs is significant (p-value<0.01, for both).

The results for non-distressed acquisitions are then consistent with the results of Sicherman and Pettway (1992) and of Martynova and Renneboog (2011), however for

[47] The positive impact it is not driven by the deals with undisclosed deal value. In unreported results, we also find a positive and significant coefficient limited to this type of acquisitions after excluding deals with undisclosed deal value, and even after additionally requiring a minimum relative deal size.

distressed acquisitions our results contradict their findings. Thus, we perform a multivariate analysis using model (5.1).

$$CAR_i = \beta_0 + \beta_1 DealValueUndisclosed_i + \beta_2 DealValueUndisclosed_i * Distress_i + \beta_3 Equity_i + \beta_4 CoreAssets_i + \beta_5 RelatedIndustry_i + \beta_6 Size_i + \beta_7 CrossBorder_i + \beta_8 SmallSeller_i + \beta_9 C\&ISpread_i + \varepsilon_i \quad (5.1)$$

Except for the variable RelativeSize[48], we use the same control variables as in the model (3.6), introduced in the sub-section 3.2.2.. As explanatory variables we include $DealValueUndisclosed_i$ that is an indicator equal to one if the deal value was not disclosed at the announcement and zero otherwise, and $DealValueUndisclosed_i * Distress_i$ which is an interaction term between the deal value undisclosed indicator and the Distress variable, which is equal to one if the acquisition is from a distressed seller. The interaction term captures the additional effect of the deal value non-disclosure when the acquisition is from a distressed seller. Therefore, the total impact for non-distressed acquisitions is given by the coefficient of DealValueUndisclosed, for distressed acquisitions the total impact is given by the sum of both coefficients.

Given that previous studies have shown that the deal value non-disclosure affects negatively acquirer returns, for DealValueUndisclosed we expect a negative effect. For the interaction term if indeed the acquisition is seen positively for distressed acquisitions as the univariate analysis suggests, then there will be a positive effect.

Table 10 shows the results for the regressions of the effect of deal value non-disclosure on acquirer returns. There are three regressions, and in terms of setting, the main difference among them is the dependent variable. In regression 1 we use the CARs for event window [-10;+1], in regression 2 for [-1;+1], and in regression 3 for [-10;+10].

The results of the univariate analysis are confirmed. We find evidence that the deal value non-disclosure has a statistically significant negative impact suggesting that not disclosing the deal value leads to lower returns, which is consistent with previous studies. In regression 1, the coefficient of DealValueUndisclosed is negative and significant at 1% level. The interaction DealValueUndisclosed*Distress is also significant (p-value<0.02), but with a positive coefficient. We interpret these results as evidence that indeed the market

[48] We excluded the variable RelativeSize because its inclusion would lead 49% (140 out of 287) of the deals with undisclosed deal value to be dropped in this multivariate analysis.

assesses differently not disclosing the deal value depending on the seller's financial condition.

Table 10. OLS Regression Analysis of CAR: The effect of Deal Value Undisclosed

This table provides OLS regressions of CAR. In regression (1) the dependent variable is CAR for event window [-10;+1], in (2) is for [-1;+1], and in (3) is for [-10;+10]. All dependent variables were estimated through the Market-Adjusted Model. All variables are defined on annex 3. In all regressions we include dummy variables that control for assets acquired industry fixed effects and year fixed effects. For each variable, we list the coefficient and in parenthesis the heteroskedasticity-corrected standard errors. ***, **, and * stand for statistical significance at 1%, 5%, and 10%, respectively. The statistically significant coefficients are denoted in bold.

	(1)	(2)	(3)
DealValueUndisclosed	**-0.020*****	**-0.013*****	**-0.023****
	(0.007)	(0.005)	(0.010)
DealValueUndisclosed*Distress	**0.035****	**0.020****	**0.036***
	(0.014)	(0.008)	(0.020)
Equity	0.006	0.005	-0.004
	(0.016)	(0.010)	(0.020)
CoreAssets	0.008	**0.011****	0.0045
	(0.007)	(0.004)	(0.009)
RelatedIndustry	0.007	0.000	0.000
	(0.006)	(0.004)	(0.009)
Size	**-0.010*****	**-0.009*****	**-0.016*****
	(0.002)	(0.002)	(0.002)
CrossBorder	0.002	0.004	0.017
	(0.008)	(0.004)	(0.012)
SmallSeller	-0.007	**-0.008***	-0.009
	(0.007)	(0.005)	(0.009)
C&ISpread	-0.000	0.026	0.012
	(0.023)	(0.019)	(0.028)
Intercept	0.025	0.015	0.050
	(0.059)	(0.039)	(0.070)
Adjusted R^2	3.2%	4.9%	2.7%
Industry and Year FF	Yes	Yes	Yes
F – Statistic	2.073***	2.675***	1.915***
N	1106	1106	1106

The lack of information about the deal value makes investors pessimist about the amount paid when the acquisition is from a non-distressed seller, whereas when the acquisition is from a distressed seller it makes them optimist. The deal value non-disclosure when the acquisition is from a distressed seller makes investors so optimist that the total effect is positive.

In regard to the results for regressions 2 and 3 that have as dependent variable the CARs for the event window [-1;+1] and for the event window [-10;+10], respectively. Our results provide evidence that the effect is not limited to the event window [-10;+1], in both regressions the coefficients of the explanatory variables maintain their signs and they continue to be statistically significant (although at different levels for regression 3). The total effect for acquisitions from distressed sellers remains positive.

6. Conclusion

In this dissertation, we investigate if fire sales exist by studying the value creation from acquiring assets from distressed firms, and focusing on acquisitions of divested assets (assets, subsidiaries, divisions) involving US nonfinancial public firms between 1997 and 2017.

In line with previous studies (e.g. Rosenfeld, 1984; Sicherman and Pettway, 1992; Moeller *et al.*, 2004), acquisitions of unlisted assets create value. Acquirers earn positive and significant average announcement period abnormal returns independently of the model or the event window considered, and regardless of the seller's financial condition.

In regard to the results that answer our research question: Do asset fire sales exist? We find that, on average, acquisitions of assets from distressed sellers create significantly more value, which suggests that fire sales of heterogeneous real assets exist. However, this result is driven by the deals in which the deal value was not disclosed at the announcement. When the deal value is disclosed the returns for acquisitions of assets from distressed and from non-distressed sellers are not statistically different from each other, which suggests the previous results (that suggest that fire sales exist) only occurred because investors believe fire sales exist, given that investors only assess the deals that they do not know the deal value as acquisitions at fire sale discounts.

Our results suggest that the type of asset being acquired and the method of payment are important determinants on the market's perception of fire sales. We find a statistically significant positive impact on acquirer returns when acquiring assets from distressed sellers but limited to those acquisitions that the market may interpret as more likely to be a fire sale, i.e., acquisitions of seller's non-core assets when the method of payment does not involve equity.

In fact, contrarily to previous work (e.g. Moeller *et al.*, 2004; Slovin *et al.*, 2005; Faccio *et al.*, 2006) that finds higher and significant returns when acquiring unlisted targets (stand-alone firms, subsidiaries only, and divested assets) with equity, we provide evidence that when the acquisition is from distressed sellers the returns are insignificant. Possibly, due to its necessity for funds, the market assumes that a distressed seller will sell the stake received rather sooner than a non-distressed seller, and thus it will not benefit from the future performance of the acquirer. Therefore, the positive signal conveyed by the acceptance of

buyer's equity by the seller argued by Slovin *et al.* (2005) does not happen in a distressed acquisition.

We also study the effect of deal value non-disclosure on CAR. The results are consistent with the market assessing differently the non-disclosure of deal value depending on the financial condition of the seller. In line with Sicherman and Pettway (1992) and Martynova and Renneboog (2011), we find a statistically significant negative impact on CAR when the deal value is not disclosed, but only for acquisitions of assets from non-distressed sellers. When the assets are acquired from distressed sellers the deal value non-disclosure has a positive and statistically significant impact on CAR. The results are consistent with our hypothesis that the lack of information about the deal value makes investors pessimist about the amount paid when the acquisition is from a non-distressed seller, whereas when the acquisition is from a distressed seller it makes them optimist. It makes investors so optimist that the total effect is positive.

Overall, our results suggest that the market interprets as fire sales, acquisitions of assets from distressed sellers when the deal value is not disclosed, and also in acquisitions of seller's non-core assets as long the method of payment does not involve equity.

However, we did not study transaction prices thus the results may be indeed only a perception of fire sales and not the reality. As such, future research on transaction prices will help to clarify this issue. Until then, to answer the question if fire sales are indeed a reality or just a perception, we will follow a similar approach to Myers (1984) and quote Black (1976, p.8): *"We don't know"*. But what we do know is that the perception of fire sales is a reality.

References

Aktas, N., E. de Bodt and R. Roll (2010), "Negotiations under the threat of an auction." *Journal of Financial Economics* 98(2): 241-255.

Alexandridis, G., K. P. Fuller, L. Terhaar and N. V. Travlos (2013), "Deal size, acquisition premia and shareholder gains." *Journal of Corporate Finance* 20: 1-13.

Alquist, R., R. Mukherjee and L. Tesar (2016), "Fire-sale FDI or business as usual?" *Journal of International Economics* 98: 93-113.

Altman, E. I. (1984), "A Further Empirical Investigation of the Bankruptcy Cost Question." *The Journal of Finance* 39(4): 1067-1793.

Ang, J. and N. Mauck (2011), "Fire Sale acquisitions: Myth vs. reality". *Journal of Banking & Finance* 35(3): 532-543.

Asquith, P., R. F. Bruner and D. W. Mullins Jr. (1983), "The gains to bidding firms from merger." *Journal of Financial Economics* 11(1-4): 121-139.

Berger, P. G. and E. Ofek (1995), "Diversification's effect on firm value." *Journal of Financial Economics* 37(1): 39-65.

Bhagat, S., N. Moyen and I. Suh (2005), "Investment and internal funds of distressed firms." *Journal of Corporate Finance* 11(3): 449-472.

Black, F. (1976), "The dividend puzzle." *Journal of Portfolio Management* 2: 5-8.

Brown, D. T. (2000), "Liquidity and liquidation: Evidence from real estate investment trusts." *The Journal of Finance* 55(1): 469-485.

Brown, D. T., C. M. James and R. M. Mooradin (1994), "Asset Sales By Financially Distressed Firms." *The Journal of Finance* 49(3): 1054-1055.

Brown, S. and J. Warner (1985), "Using daily stock returns: The case of event studies." *Journal of Financial Economics* 8: 205-258.

Chang, S. (1998), "Takeovers of privately held targets, methods of payment, and bidder returns." *The Journal of Finance* 53(2): 773-784.

Chari, A., P. P. Ouimet and L. L. Tesar (2010), "The value of control in emerging markets." *Review of Financial Studies* 23(4): 1741-1770.

Chu, Y. Q. (2016), "Asset Fire Sales by Banks: Evidence from Commercial REO Sales." *Review of Corporate Finance Studies* 5(1): 76-101.

Comment, R. and G. A. Jarrell (1995), "Corporate focus and stock returns." *Journal of Financial Economics* 37(1): 67-87.

Coval, J. and E. Stafford (2007), "Asset fire sales (and purchases) in equity markets." *Journal of Financial Economics* 86(2): 479-512.

Demsetz, H. and K. Lehn (1985), "The strucuture of corporate ownership: causes and consequences." *Journal of Political Economy* 93(6): 1155-1177.

Denis, D. J. and D. K. Denis (1995), "Causes of financial distress following leveraged recapitalizations." *Journal of Financial Economics* 37(2): 129-157.

Dinc., S., I. Erel and R. Liao (2017), "Fire sale discount: Evidence from the sale of minority equity stakes." *Journal of Financial Economics* 125(3): 475-490.

Edmans, A., I. Goldstein and W. Jiang (2012), "The Real Effects of Financial Markets: The Impact of Prices on Takeovers." *The Journal of Finance* 67(3): 933-971.

Elkamhi, R., J. Ericsson and C. A. Parsons (2012), "The cost and timing of financial distress". *Journal of Financial Economics* 105(1): 62-81.

Ellul, A., C. Jotikasthira and C. T. Lundblad (2011), "Regulatory pressure and fire sales in the corporate bond market." *Journal of Financial Economics* 101(3): 596-620.

Faccio, M., J. J. McConnell and D. Stolin (2006), "Returns to Acquirers of Listed and Unlisted Targets." *Journal of Financial and Quantitative Analysis* 41(1): 197-220.

Finlay, W., A. Marshall and P. McColgan (2016), "Financing, fire sales, and the stockholder wealths of asset divestiture announcements." *Journal of Corporate Finance*, http://dx.doi.org/10.1016/j.jcorpfin.2016.09.005.

Fuller, K., J. Netter and M. Stegemoller (2002), "What Do Returns to Acquiring Firms Tell Us? Evidence from Firms That Make Many Acquisitions." *The Journal of Finance* 57(4): 1763-1793.

Gilchrist, S. and C. Himmelberg (1995), "Evidence on the role of cash flow for investments." *Journal of Monetary Economics* 36: 541-572.

Greene, D. (2017), "Valuations in Corporate Takeovers and Financial Constraints on Private Targets". *Journal of Financial and Quantitative Analysis* 52(4): 1343-1373.

Harford, J. (2005), "What drives merger waves?" *Journal of Financial Economics* 77: 529-560.

Harris, M. and A. Raviv (1991), "The theory of capital structure." *The Journal of Finance* 46(1): 297-355.

Hite, G., J. Owers and R. Rogers (1987), "The market for interfirm asset sales: Partial sell-offs and total liquidations." *Journal of Financial Economics* 18(2): 229-252.

Hotchkiss, E. S. and R. M. Mooradian (1998), "Acquisitions as a Means of Restructuring Firms in Chapter 11." *Journal of Financial Intermediation* 7, 240-262.

Jaffe, J., J. Jindra, D. Pedersen, and T. Voetmann (2015), "Returns to acquirers of public and subsidiary targets." *Journal of Corporate Finance* 31: 246-270.

Jarrell, G. A. and A. B. Poulsen (1989), "The Returns to Acquiring Firms in Tender Offers: Evidence from Three Decades." *Financial Management* 18(3): 12-19.

Jensen, M. C. (1986), "Agency costs of free cash flow, corporate finance and takeovers." *American Economic Review* 76(2): 323-339.

Jensen, M. C. and W. H. Mecking (1976), "Theory of the Firm: Managerial Behavior, Agency Costs, and Capital Structure." *Journal of Financial Economics* 3(4): 305-360.

Jindra, J. and T. Moeller (2015), "Target Financial Independence and Takeover Pricing." *Journal of Financial Research* 38(3): 379-413.

John, J., L. H. P. Lang, and J. Netter (1992), "The voluntary restructuring of large firms in response to performance decline." *The Journal of Finance* 47(3): 891-917.

John, K. and E. Ofek (1995), "Asset sales and increase in focus." *Journal of Financial Economics* 37(1): 105-126.

Kim, E. H. (1978), "A mean-variance theory of optimal capital structure and corporate debt capacity." *The Journal of Finance* 33(1):45-63.

Klein, A. (1986), "The timing and Substance of Divestiture announcements: individual, simultaneous and cumulative effects." *The Journal of Finance* 41(3): 685-696.

Kraus, A. and R. Litzenberger (1973), "A State Preference Model of Optimal Financial Leverage." *The Journal of Finance* 28(4): 911-922.

Krugman, J. (2000), *Fire-Sale FDI*, Chicago, Univ. Chicago Press.

Lang, L., A. Poulsen and R. Stulz (1995), "Asset Sales, Firm Performance, and the agency Costs of Managerial Discretion." *Journal of Financial Economics* 37(1): 3-37.

Lasfer, M. A., P. S. Sudarsanam and R. J. Taffler (1996), "Financial distress, asset sales, and lender monitoring." *Financial Management* 25(3): 57-66.

Loderer, C. and K. Martin (1990), "Acquisitions by Listed Firms: The Experience of a Comprehensive Sample." *Financial Management* 19(4): 17-33.

MacKinlay, A. C. (1997), "Event studies in Economics and Finance." *Journal of Economic Literature* 35: 13-39.

Mantecon, T. (2008), "An analysis of the implications of uncertainty and agency problems on the wealth effects to acquirers of private firms." *Journal of Banking & Finance* 32(5): 892-905.

Maquiera, C., W. Megginson and I. Nail (1998), "Wealth creation versus wealth redistributions in pure stockfor-stock mergers." *Journal of Financial Economics* 48(1): 3-33.

Martynova, M. and L. Renneboog (2011), "The performance of the european market for corporate control: evidence from the fifth takeover wave." *European Financial Management* 17(2): 208-259.

Masulis, R. W. and R. Nahata (2011), "Venture Capital Conflicts of Interest: Evidence from Acquisitions of Venture-Backed Firms." *Journal of Financial and Quantitative Analysis* 46(2): 395-430.

Meier, J. A. and H. Servaes (2015), "The Bright Side of Fire Sales." Working paper, London Business School.

Milgrom, P. R. (1981), "Good News and Bad News: Representation Theorems and Applications." *The Bell Journal of Economics* 12(2): 380-391.

Miller, M. and M. Modigliani (1958), "The Cost of Capital, Corporation Finance, and the Theory of Investment." *American Economic Review* 48(3): 261-297.

Moeller, S. B., F. P. Schlingemann and R. M. Stulz (2004), "Firm size and the gains from acquisitions." *Journal of Financial Economics* 73(2): 201-228.

Morck, R., A. Shleifer and R. Vishny (1990), 'Do managerial objectives drive bad acquisitions?', *The Journal of Finance* 45(1): 31-48.

Myers, S. C. (1984), "The capital structure puzzle." *The Journal of Finance* 39(3): 575-592.

Myers, S. C. (2001), "Capital Structure." *Journal of Economic Perspectives* 15(2): 81-102.

Myers, S. C. and N. S. Majluf (1984), "Corporate financing and investment decisions when firms have information the investors do not have." *Journal of Financial Economics* 13(2): 187-221.

Officer, M. S. (2007), "The price of corporate liquidity: Acquisition discounts for unlisted targets." *Journal of Financial Economics* 83(3): 571-598.

Oh, S. (2018), "Fire-sale acquisitions and intra-industry contagion." *Journal of Corporate Finance* 50: 265-293.

Pulvino, T. C. (1998), "Do asset fire sales exist? An empirical investigation of commercial aircraft transactions." *The Journal of Finance* 53(3): 939-978.

Roll, R. (1986), "The hubris hypothesis of corporate takeovers." *Journal of Business* 59(2): 197-216.

Rosenfeld, J. D. (1984), "Additional Evidence on the Relation Between Divestiture Announcements and Shareholder Wealth." *The Journal of Finance* 39(5): 1437-1448.

Schlingemann, F. P., R. M. Stulz and R. A. Walking (2002), "Divestitures and the liquidity of the market for corporate assets." *Journal of Financial Economics* 64(1): 117-144.

Scott, J. H. (1976), "A Theory of Optimal Capital Structure." *Bell Journal of Economics and Management Science* 7(1): 33-54.

Shleifer, A. and R. W. Vishny (1986), "Large Shareholders and Corporate Control." *Journal of Political Economy*, 94 (31), 461-488.

Shleifer, A. and R. W. Vishny (1992), "Liquidation Values and Debt Capacity - A Market Equilibrium Approach." *The Journal of Finance* 47(4): 1343-1366.

Sicherman, N. W. and R. H. Pettway (1987), "Acquisition of Divested Assets and Shareholders' Wealth." *The Journal of Finance* 42(5): 1261-1273.

Sicherman, N. W. and R. H. Pettway (1992),"Wealth Effects for Buyers and Sellers of the Same Divested Assets". *Financial Management* 21(4): 119-128.

Slovin, M. B., M. E. Sushka and J. A. Polonchek (2005), "Methods of Payment in Asset Sales: Contracting with Equity versus Cash". *The Journal of Finance* 60(5): 2385-2407.

Travlos, N. G. (1987), "Corporate takeovers bids, method of payment, and bidding firm's stock returns." *The Journal of Finance* 42(4): 943-963.

Warner, J. B. (1977), "Bankruptcy Costs - Some Evidence." *The Journal of Finance* 32(2): 337-347.

Weitzel, U., G. Kling and D. Gerritsen (2014), " Testing the fire-sale FDI hypothesis for the European financial crisis." *Journal of International Money and Finance* 49(B): 211-234.

Whitaker, R. B. (1999), "The early stages of financial distress." *Journal of Economics and Finance* 23(2): 123-133.

Internet Pages

http://pages.stern.nyu.edu/~adamodar/, accessed on February 15th, 2018.

https://money.cnn.com/2012/04/20/markets/chesapeake-energy-fire-sale/index.htm, accessed on June 16th, 2018.

https://www.federalreserve.gov/releases/e2/e2chart.htm, accessed on March 9th, 2018.

https://www.fool.com/investing/2017/08/12/it-looks-like-amc-entertainments-fire-sale-has-beg.aspx, accessed on October 23rd, 2017.

https://www.sec.gov/edgar/searchedgar/companysearch.html, accessed on January and February, 2018.

Annexes

Annex 1. Main results on short-term of prior studies on Mergers and Acquisitions

This table summarises the main results on the short-term and methodological aspects of recent studies on M&A. MAM = Market-Adjusted model; MM = Market Model; CAR= Cumulative Abnormal Return.

Study	Sample Period	Sample Size	Estimation Period (days)	Event Window (days)	Methodology	Results[49] (in %)		
						Public	Private	Subsidiary
Fuller *et al.* (2002)	1990-2000	3,135	____	[-2;+2]	MAM CAR	-1.00 (456)	2.08 (2.060)	2.75 (619)
Moeller *et al.* (2004)	1980-2001	12,023	[-260;-6]	[-1;+1]	MM CAR	-1.022 (2,642)	1.496 (5,583)	2.002 (3,798)
Faccio *et al.* (2006)[50]	1996-2001	4,429	____	[-2;+2]	MAM CAR	-0.38[51] (735)	1.51 (1,956)	1.44 (1,738)
Mantecon (2008)	1996-2003	135	[-250;-60]	[-1; 0]	MM CAR	-1.83 (84)	4.11 (51)	____
Jaffe *et al.* (2015)	1981-2012	3,406	____	[-1;+1]	MAM CAR	-1.46 (2,571)	____	2.14 (835)

[49] In between brackets is the number of observations.
[50] Unlike the other studies, that are for the US, this one is for the Western Europe.
[51] Not statistically significant.

Annex 2. The impact of the bargaining condition: results from previous studies

This table summarises the results of previous studies in regard of the impact of independent variables that represent the bargaining condition of the target and/or seller on the dependent variable. CAR is the cumulative abnormal return, [+] represents a positive impact and [–] a negative impact.

Study	Dependent variable	Independent Variable	Impact	Significant?
Sicherman and Pettway (1992)	CAR	Downgrade	[+]	No
Faccio *et al.* (2006)	CAR	Unlisted stand-alone target	[+]	Yes
		Unlisted subsidiary target	[+]	Yes
Masulis and Nahata (2011)	Takeover Premium	VC liquidity	[–]	Yes
	CAR		[+]	No
Jindra and Moeller (2015)	Takeover premium	Target Financial independence	[+]	Yes
	CAR		[–]	Yes
Greene (2017)	Acquisition multiple	DeregulatedState*After	[+]	Yes
	CAR		[–]	Yes
	Acquisition multiple	DeregulatedState	[–]	Yes
	CAR		[+]	Yes

Annex 3. Variables Definition

Variable	Description
Acquirer Size	Market value of equity one month before the deal announcement date. Source: DataStream
All-Cash	Any combination of cash, debt, or liabilities. Source: Zephyr
C&I Spread	The spread between the average rate charged for commercial and industrial loans and the fed funds rate in the previous quarter to the announcement date reported in the Federal Reserve's Survey of Terms of Business Lending. Source: Board of Governors of the Federal Reserve System website
Core Assets	Zero-one dummy variable equal to one, if the assets acquired share the same 3-digit SIC code with the seller. Source: Zephyr
Cross Border	Zero-one dummy variable equal to one if the assets acquired do not have as country code the US, zero otherwise. Source: Zephyr
Deal Value	The deal value reported on Zephyr. When not available, the amount paid reported on firm's SEC filings. Sources: Zephyr, SEC's EDGAR
Deal Value Undisclosed	Zero-one dummy variable equal to one when the deal value is not available on Zephyr. Source: Zephyr
Distress	Zero-one dummy variable, one represents an acquisition of assets from a distressed seller, zero otherwise. Firms in distress are defined as those with negative earnings on the previous fiscal year to the sale announcement. Source: DataStream
Equity	Zero-one dummy variable equal to one if the method of payment involves any form of equity. Source: Zephyr
Leverage	Ratio between the book values of total debt and total assets on the fiscal year before the deal announcement. Source: DataStream
Non Core Assets	Zero-one dummy variable, equal to one if the assets acquired do not share the same 3-digit SIC code with the seller. Source: Zephyr
Non Equity	Zero-one dummy variable equal to one if the method of payment does not involve any form of equity. Source: Zephyr
Related Industry	Zero-one dummy variable, equal to one if the acquirer shares the same 3-digit SIC code with the asset acquired, zero otherwise. Source: Zephyr

(Continues on the next page)

Variable	Description
Relative Size	The ratio between deal value and acquirer's size. If the deal value is undisclosed, we assume the market is able to infer the relative size of the acquisition, and use the actual amount paid to compute the ratio. Sources: Zephyr, SEC's EDGAR
Seller Size	Market value of equity one month before the deal announcement date. Source: DataStream
Size	Logarithm of acquirer's size.
Small Seller	Zero-one dummy variable, equal to one if the seller size is equal or less than the median seller size of the full sample, zero otherwise.

Annex 4 . CARs for Event Window [-10;-2]

This table shows the results from the event study methodology applied to the Distressed and Non-Distressed samples for event window [-10;-2]. Distressed represents acquisitions of assets from distressed sellers and Non-Distressed represents acquisitions of assets from non-distressed sellers. The last column reports the differences between Distressed and Non-Distressed samples. CARs were estimated through the Market-Adjusted Model. For means we performed T-tests, for medians we performed Wilcoxon signed rank tests, and Wilcoxon rank-sum (Mann-Whitney) tests for the differences between medians. ***, **, and * denote statistical significance at 1%, 5%, and 10%, respectively.

	Distressed	Non-Distressed	Difference
Panel A: CARs for Cumulative Returns			
Mean	0.76%*	0.26%	0.50 p.p.
Median	0.55%**	0.34%	0.20 p.p.
Panel B: CARs for Market-Adjusted Model			
Mean	0.78%*	0.15%	0.62 p.p.
Median	0.76%**	0.17%	0.59* p.p.
Panel C: CARs for Market Model			
Mean	0.75%*	0.12%	0.63 p.p.
Median	0.64%**	0.06%	0.58* p.p.
N	381	734	

FACULDADE DE **ECONOMIA**